January 1943

THE FOUNDRY

FIFTY-FIRST YEAR

TECHNOLOGY DEPT.

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DETROIT

NICHOLLS MOLDING MACHINES

A battery of Nicholls Machines helping war production.

may be the solution to your shortage of man-power

Our 33rd Year

WM. H. NICHOLLS CO., Inc.

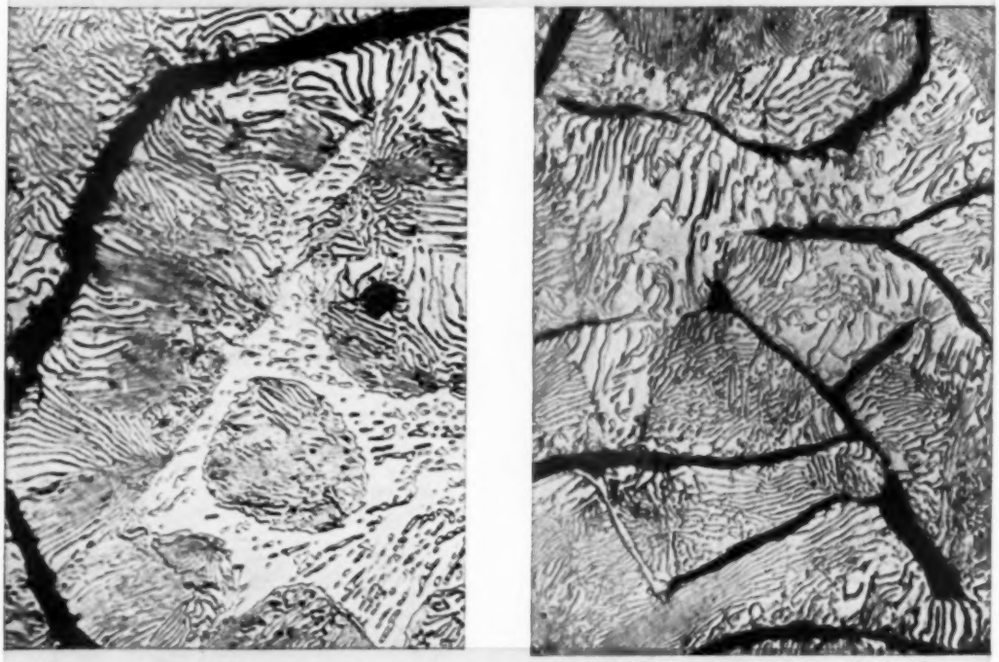
RICHMOND HILL · LONG ISLAND · NEW YORK

Foreign Manufacturers and Selling Agents—

For Continental Europe and Great Britain—The George Fischer Steel and Iron Works, Schaffhausen, Switzerland

Refining with PURITE *insures* CLEANER IRON AND STRONGER CASTINGS

The value of Purite in refining cupola cast iron is now generally recognized by progressive foundrymen and metallurgists everywhere. The refining is more than simply removing sulphur. Occluded gases are expelled by the boiling action set up by Purite and entrained oxide-silicates and other non-metallic impurities are washed out of the iron and carried off in the Purite slag.



Untreated **Treated**

Photomicrographs of an all-scrap mixture cast iron at 1,000 X etched with 2 percent nital, before and after refining with Purite. See how Purite refining washes out manganese sulphide and complex silicate inclusions, breaks up the phosphide areas, reduces the size of graphite particles and produces a more uniform, dense structure iron.

Molten iron is always charged with gases and gaseous compounds as well as some non-metallic impurities, more or less varying with the character of the charge, melting practice and refinement of the metal in the hearth of the cupola or in the ladle. These tend to be squeezed out as the iron freezes in the mold, sometimes causing pinholes or gas pockets and segregated defects.

Purite reacts with non-metallic inclusions or silicates in molten cast iron, forming fluid soda slags which rise out of the iron. It combines readily with gaseous sulphur which is held in the Purite slag or is driven off, along with other gases, by the boiling action set up in the iron by Purite. Thus it is seen how refining with Purite, whether in the cupola hearth or in the ladle, increases the strength and improves the grain structure, soundness and machinability of iron castings.

Ask for new bulletin P41 "REFINING CAST IRON WITH PURITE"

THE MATHIESON ALKALI WORKS (INC.)

60 EAST 42ND STREET, NEW YORK, N. Y.

FOR OUR ARMED FORCES

INDUSTRIAL AMERICA HAS PLEDGED

ALL-OUT AND EVER-INCREASING PRODUCTION

FOR OUR ARMED FORCES

—THAT THEY MAY QUICKEN THE DAY OF VICTORY

—THAT THEY MAY RETURN IN SAFETY

—AND THAT THE WORLD MAY BE ASSURED

OF A LASTING PEACE

TIME TO PAUSE AND SAY

Thanks!

A Message to Our Friends and Customers:

We don't want to merely thank you for the orders you have given us during the past twelve months.

Of course, we wouldn't be human if we didn't appreciate the business you've given us. We certainly do.

This year, however, it goes deeper than that. There's a war on and what we really want to say is: "Thanks, customers, for helping us take our cracks at the Axis!"

Much as we'd like to do it, we can't hit Hitler with a bag of parting, or hammer Hirohito with a barrel of core wash.

The castings you make with the aid of our products are doing that job.

We can only help you, and during the year just passed you have let us help plenty.

For that privilege, we repeat: "Thanks."

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland, Ohio

CHICAGO CHATTANOOGA, TENN. DETROIT MILWAUKEE MINNEAPOLIS NEW YORK ST. LOUIS RICHMOND, VA. Minot UPTON, WYO.

THE FOUNDRY

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NUMBER 1

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THERE IS A LINOIL
- *and* in 18 other

USERS OF LINOIL in St. Louis and the territory adjacent to it have a front-line supply base right at hand, no extended lines of transportation with possibilities of delay, but spot oil when they want it.

It makes it very nice for the foundrymen of the St. Louis territory. A comfortable, secure feeling, and an economy, too.

And, you know, it isn't alone the St. Louis region that has the safe feeling of Linoil being warehoused right at hand. The same is true of Boston and Los Angeles.

Yes, and the same is true of Hartford, Conn., and Bayway, N. J. across from New York City, and Buffalo, and Birmingham, and Dayton, Ohio, and Indianapolis, and Chicago, and Moline, Ill., and Milwaukee, Minneapolis, Kansas City, New Orleans, Houston, San Francisco, Seattle, Cleveland, and Toronto.

In every important foundry center in the country there is a Linoil warehouse with Linoil ready to be rushed to you whenever the need is urgent, or whenever transportation economy is a factor.

Even to those foundries remote from the larger foundry centers our warehousing plan is advantageous for it means a shorter haul and shorter time than would be needed to get the oil clear from the factory.

These strategically located warehouses are not something new, a necessity of wartime emergency, but have been in use for years made necessary by the nationwide acceptance of Linoil by the foundrymen.

Order Linoil next time and see how you like it. Nearly a half-million gallons a month used by foundrymen.

THE WERNER G.

(DIVISION OF ARCHER

2191 WEST 110 STREET WOODBINE

WAREHOUSE IN ST. LOUIS
key foundry cities

LINOIL

G. Vineyard, coreroom foreman, says to J. Rafferty and G. Wahl: "Linoil sure is the logical oil for cores." Maybe he does not use exactly those words, but when a man who knows Linoil talks about Linoil it always adds up to the same thing: That Linoil *is* the *logical* oil for cores. Pictures show transformer case cores and motor housing shields.

Century Foundry

3727 MARKET STREET

SAINT LOUIS, MO.

"We have been using Linoil for many years, and because of its uniformity we have made it the standard for large and small cores. With a uniform oil, mixtures can be standardized. Linoil is this kind."

—H. P. MUELLER,
General Manager

The story of Linoil is told by men who know.
It is told by men you know.
It is told by men you know know.

SMITH COMPANY

DANIELS - MIDLAND COMPANY)

4690 CLEVELAND, OHIO

BETTER · · · CHEAPER · HOW TO ·

NORTH BROTHERS Manufacturing Company of Philadelphia had to clean a greatly increased volume of castings in *less time than ever before, with a labor force deeply cut by the draft, and in a limited cleaning room space.* A Pangborn Airless ROTOBLAST Barrel was installed to answer the problem. Now, after ten months operation, production has more than doubled and cleaning costs have been reduced 37%. "Without this equipment," they write, "we never could have handled the vast increase of our business which we have handled during the past year."

At an East Chicago war plant hundreds of large gun mounts "held up" the cleaning department. A Pangborn Blast Room was proposed to end the bottleneck. This Room is now in operation during two daily eight-hour shifts. Production easily keeps ahead of their stiffest work schedule.

Cast tank armor is hard to clean. Pouring temperatures and annealing temperatures both produce hard scale. At a well-known Rochester foundry a large Pangborn Table, throwing 390 pounds of steel abrasive from each of two ROTOBLAST units per minute, cleans through such scale down to virgin metal in two passes with table speed at 2 r.p.m. Customer well pleased with results.

The $10,000,000 aluminum foundry at Flint, Mich., built by the Defense Plant Corp. and operated by the Buick Motor Division of General Motors Corp. needed the best

WORLD'S LARGEST MANUFACTURER OF BLAST

PANG

PANGBORN CORPORATION . . . . . .

WITHOUT WASTE

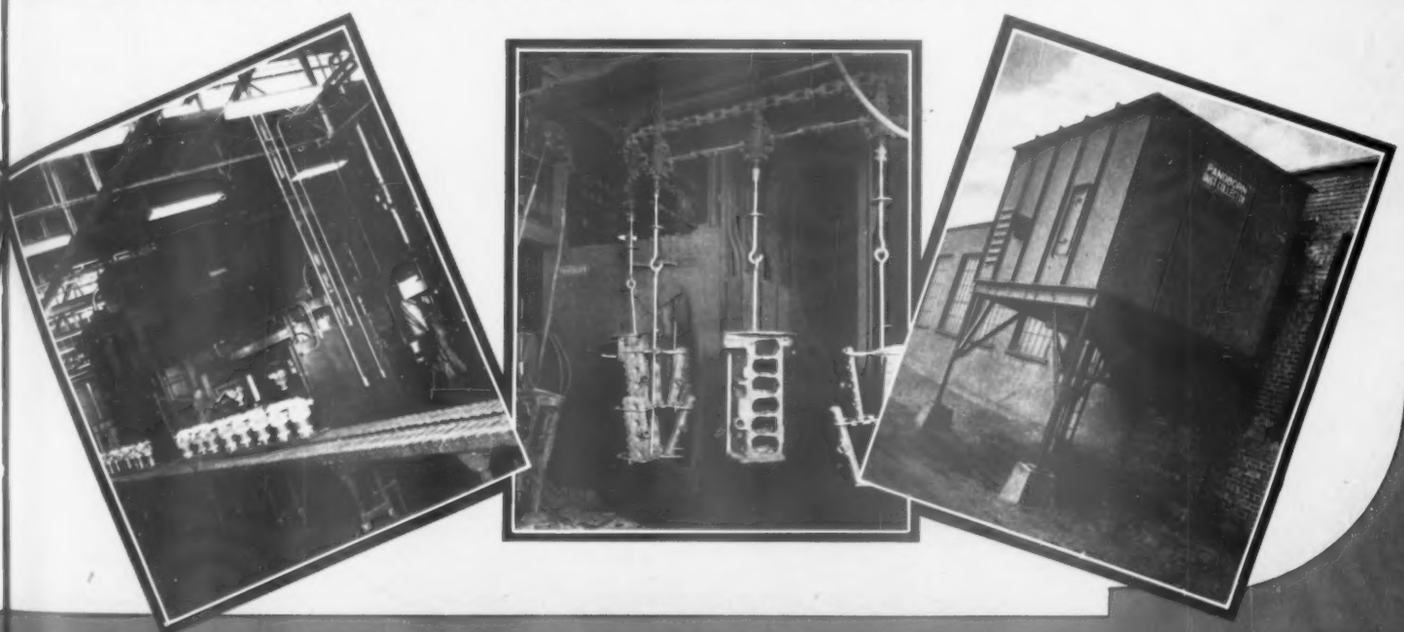
SAVE BLAST CLEANING POWER • OFFSET LABOR CONSCRIPTIONS •

IN 1943

blast cleaning equipment made to clean thousands of aluminum alloy aircraft cylinder head castings. Eight Pangborn Tables with two ROTOBLAST units each have been installed and are now shot blasting the castings after they come from the shake out, after grinding, and after heat treating. This exceptional volume of fine work is handled with speed, is cleaned with absolute uniformity and at a low cost.

As we close the record on transactions of 1942 we are grateful that Pangborn Blast Cleaning and Dust Confrol equipment has been able to successfully help so many foundries reach their production goals of the year.

As a preview of 1943 we tell you that our own production of equipment will increase, delays in delivery will be shortened, our equipment performance will be improved as quickly as advances are suggested by the finest engineering skill obtainable, and service to our thousands of customers given honestly, promptly and with only one end in mind—TO HELP WIN THE WAR IN 1943!

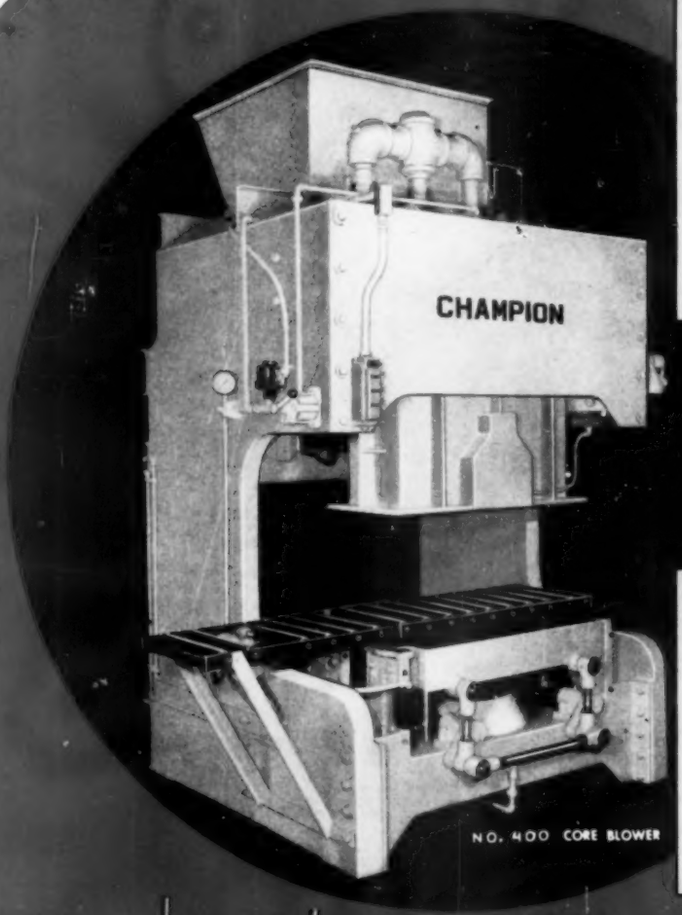


CLEANING AND DUST CONTROL EQUIPMENT

GBORN

HAGERSTOWN, MARYLAND

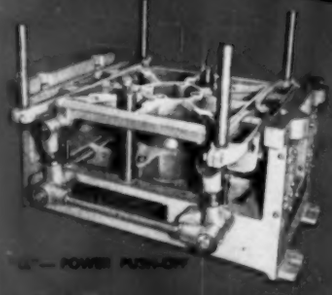
Champion *greets*

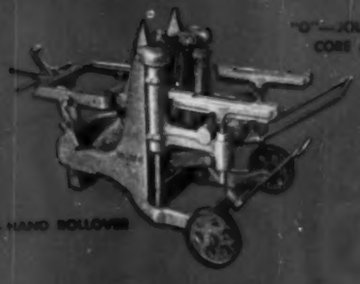


NO. 400 CORE BLOWER

Champion
MOLDING and CORE MACHINES

45 years
OF SERVICE TO THE FOUNDRY INDUSTRY


"S"—POWER PUSH-OFF

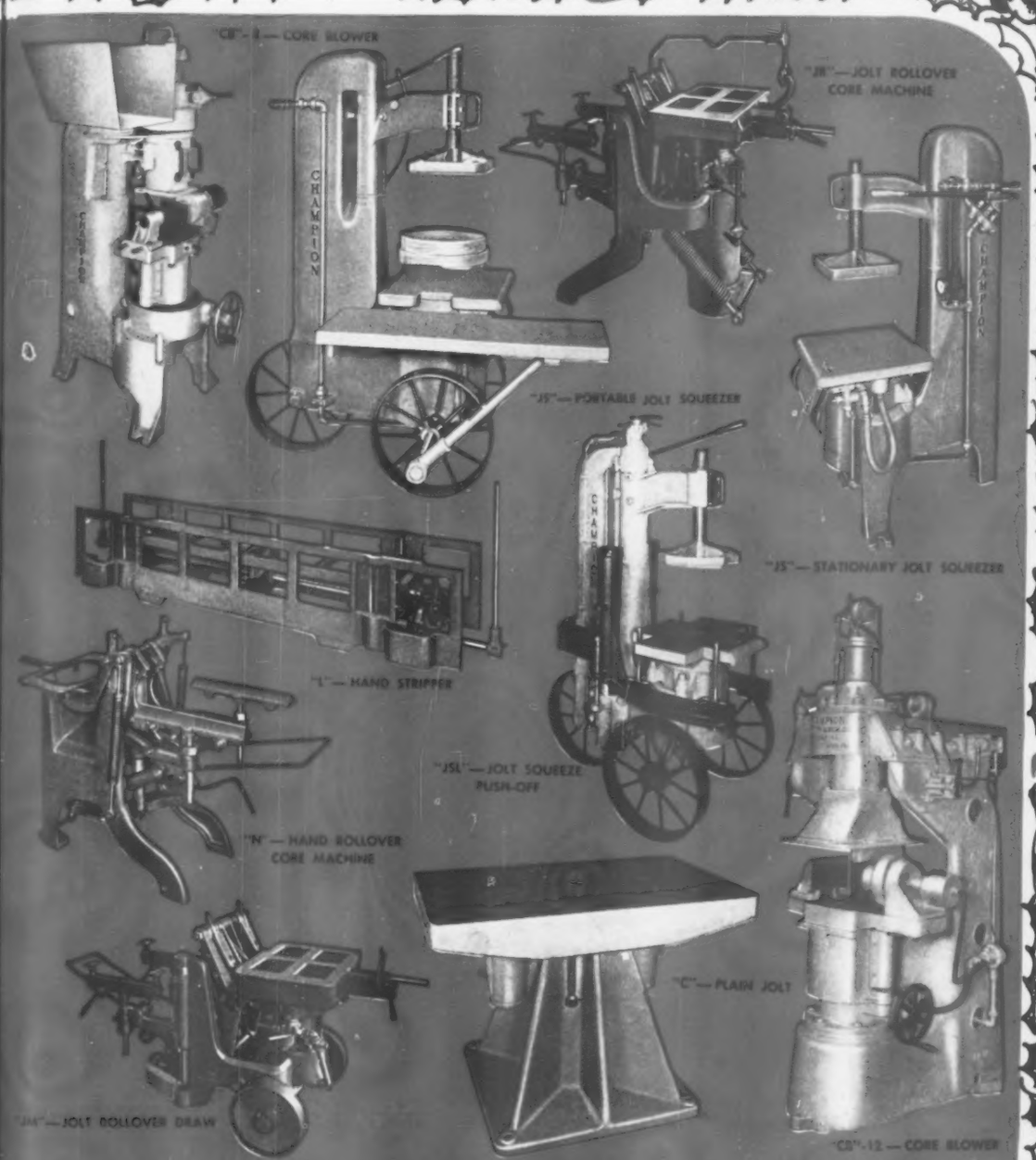

"W"—HAND ROLLOVER

"O"—JOLT ROLLOVER CORE MACHINE

Every Champion installation is guaranteed to do the job you expect, exactly as you plan it.

ts a great Industry

–THE FOUNDRY


"CB"-8 — CORE BLOWER
"JR" — JOLT ROLLOVER CORE MACHINE
CHAMPION
"JS" — PORTABLE JOLT SQUEEZER
"JS" — STATIONARY JOLT SQUEEZER
"L" — HAND STRIPPER
"JSL" — JOLT SQUEEZE PUSH-OFF
"N" — HAND ROLLOVER CORE MACHINE
"C" — PLAIN JOLT
"JH" — JOLT ROLLOVER DRAW
"CB"-12 — CORE BLOWER

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FOUNDRY ENGINEERS AND SALES STAFF

OF

BARTLETT-SNOW

We Carry On

★ In the death of Mr. Herbert L. McKinnon, to quote from one of the many letters received — "The Industry has lost an engineer who has contributed more than anyone else I know to its problems." We, in the Foundry Division, who worked with him, have lost a truly great friend — and a much loved and respected department head. ★ Mahlon E. First, for 22 years Chief Engineer — and intimately identified with all Bartlett-Snow practices and installations, is now Director of Foundry Operations. ★ It shall be our constant effort, to broaden the trail "Mac" pioneered, and through the design and proper application of equipment assure dependable, more efficient and more profitable foundry operation. The Foundry Division, The C. O. Bartlett & Snow Company, 6200 Harvard Avenue, Cleveland, Ohio.

SEND FOR YOUR COPIES OF BULLETINS NO. 1210 AND 1030

B&P

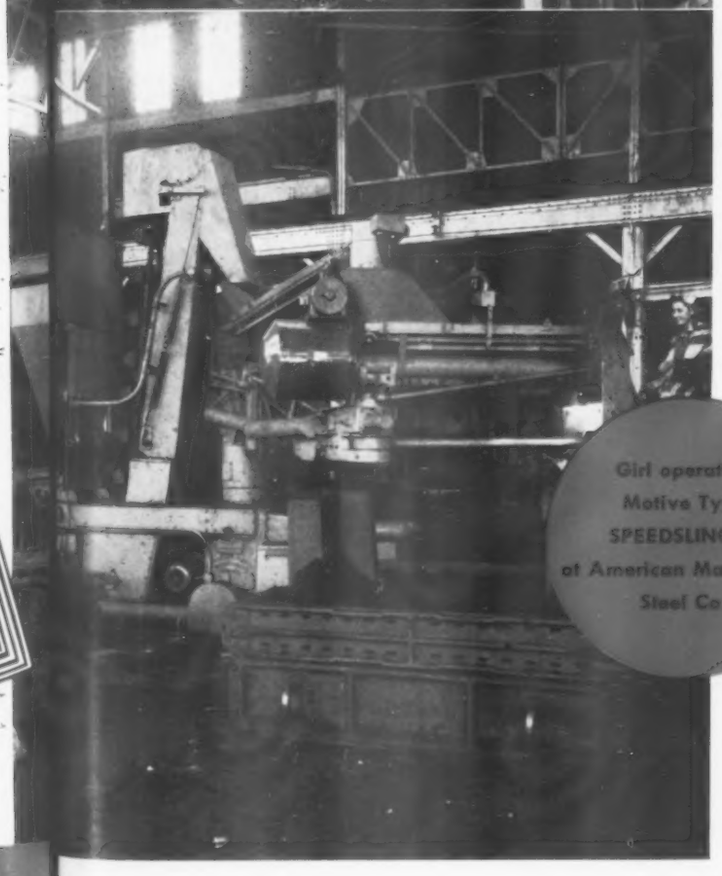
THE SPEEDMULLOR

B&P

THE SPEEDSLINGER

Speedmullors and Speedslingers for 1943

Model "80" SPEEDMULLOR at Pacific Cast Iron Pipe Co. Provo, Utah



Girl operating Motive Type SPEEDSLINGER at American Manganese Steel Co.

SPEEDMULLORS offer you more advanced features and exclusive economies than any mill you have ever witnessed in operation. With the ***Speedmullor***, you mull far greater quantities of sand within greatly reduced floor areas. You cool hot sand from the highest temperatures to 5 degrees above room temperature in a 1½-minute mulling cycle. You improve your sand vastly through the constant agitation and aeration which takes place when sand is mulled on the side walls where the most thorough mixing is accomplished between two rubber surfaces—wheel and wall. You use 30 to 50 percent less oils and binders to secure better cores from greatly reduced baking time. You get lifetime service from the rubber wheels which require neither care, maintenance nor reversal.

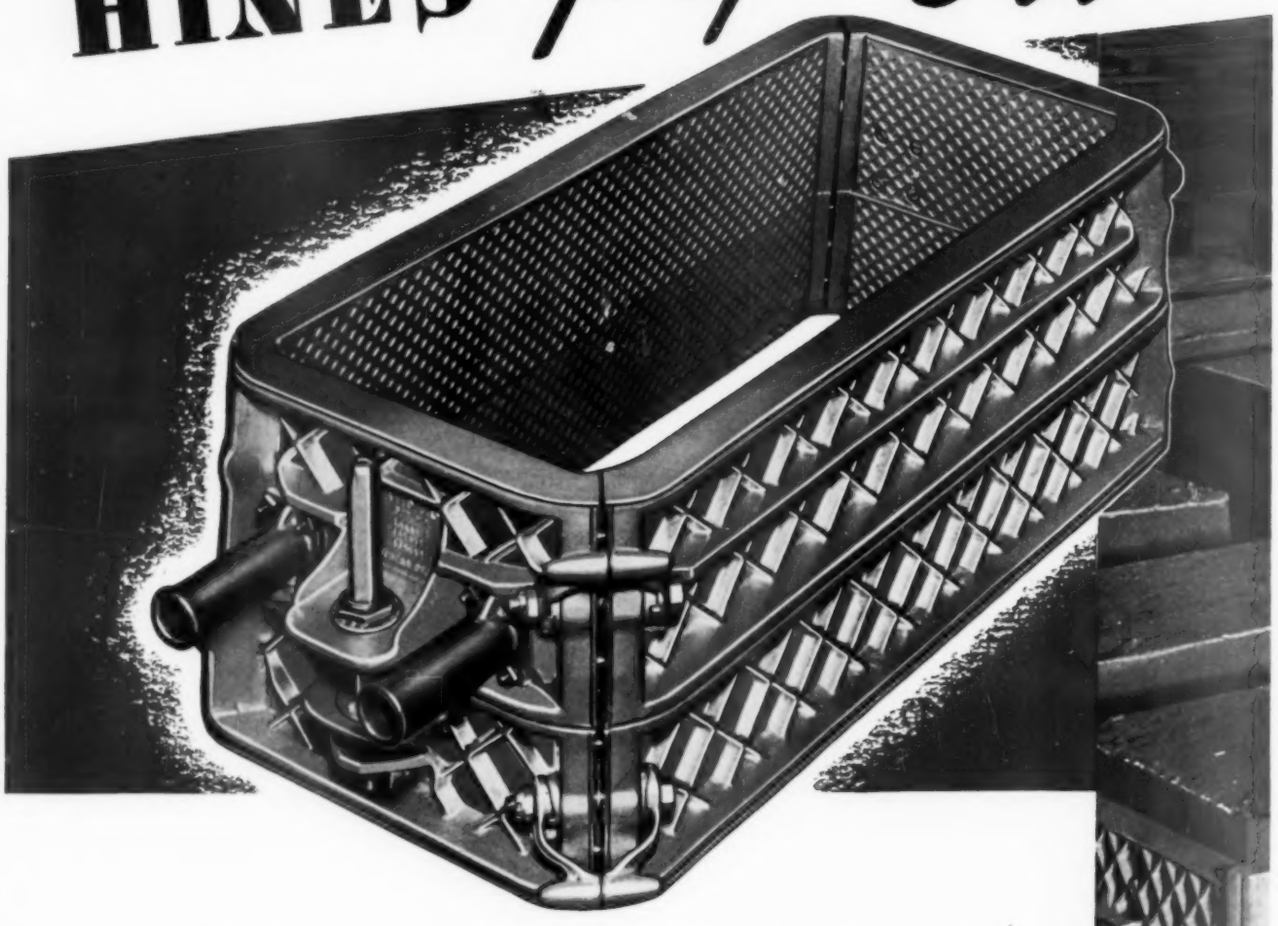
SPEEDSLINGERS are the modern method for ramming molds of all shapes and sizes, from snaps to the largest pit molds. They ram a more secure mold than any other machine in the world. Ramming density is under the constant control of the operator who can ram hard or soft in any part of the mold. They use far fewer gaggers and bars. They require of the operator neither brute strength nor long training. A man, woman or child can learn to operate the ***Speedslinger*** in 24 hours—to ram anything from a sash weight pulley to the largest casting ever poured. That is why America's outstanding production engineers are demanding more and more ***Speedslingers*** to speed foundry production to new highs while reducing ramming costs to new lows.

THE BEARDSLEY & PIPER CO.

2541 N. KEELER AVE. • CHICAGO

Banish trouble with a POP-OFF*

HINES "Pop-Off"*

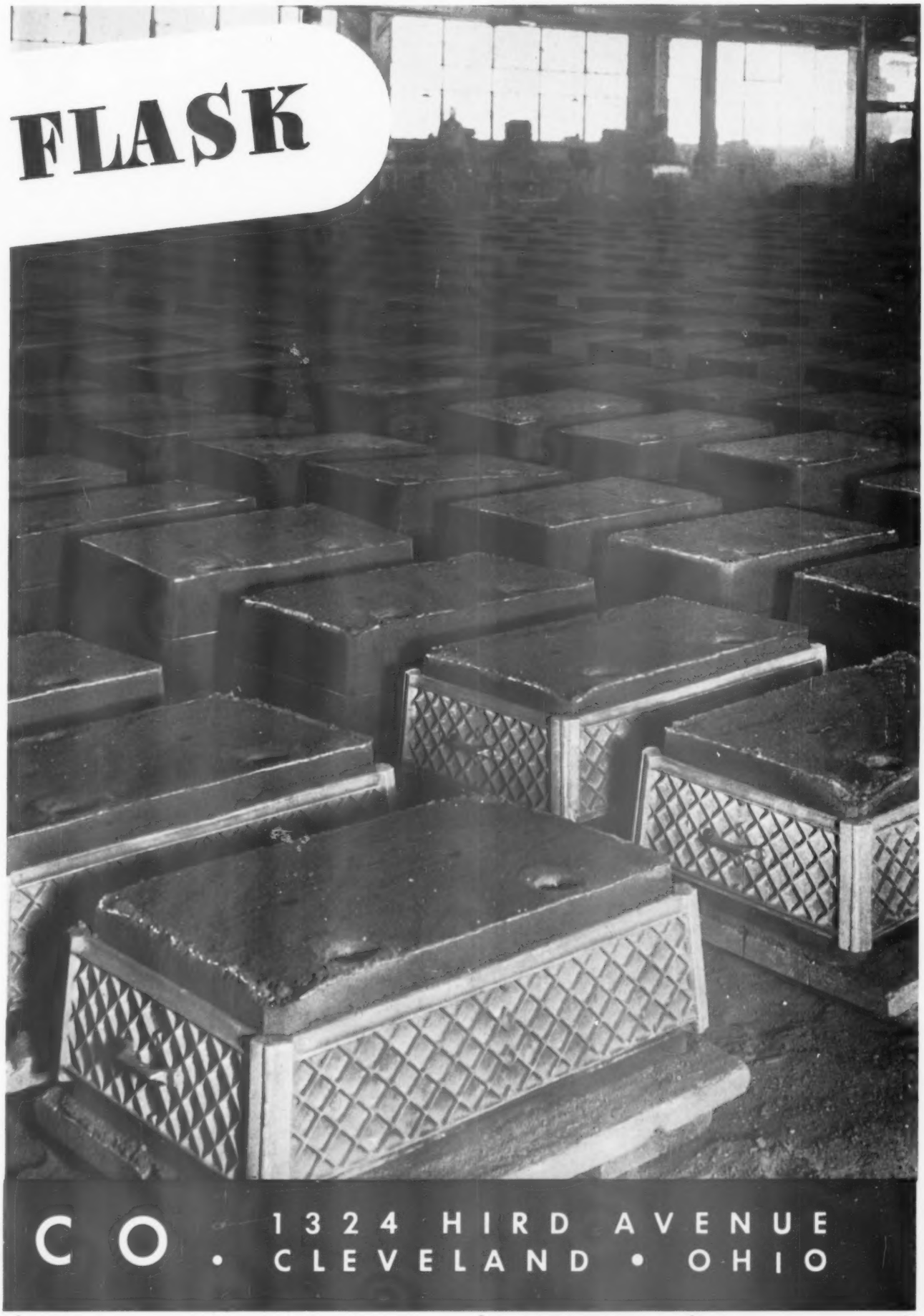


This is a typical scene showing what just one HINES FLASK is doing to lick the "Slant Eyes."

There are thousands of other HINES FLASKS all over this country, Canada, England, and Australia doing the same thing.

*Trade Mark Reg. U. S. Patent Office

HINES FLASK


FLASK
CO
1324 HIRD AVENUE
• CLEVELAND • OHIO

MACKLIN
GRINDING WHEELS

Macklin Field Engineers are experienced in recommending the best Macklin wheel to use on any grinding job. There is a Macklin grinding wheel suited to grind every part required in today's production demands. Ask for the services of a Macklin Field Engineer.

DON'T TAKE BONDAGE — INVEST IN BONDS

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Manufacturer of Grinding Wheels

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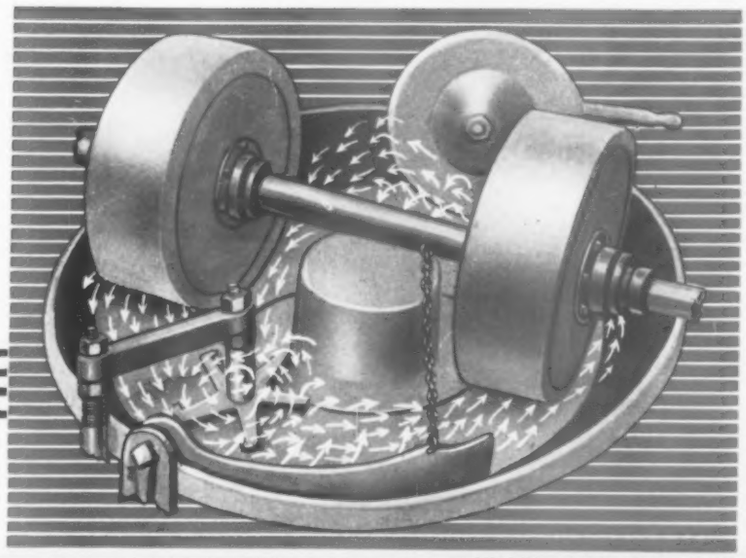


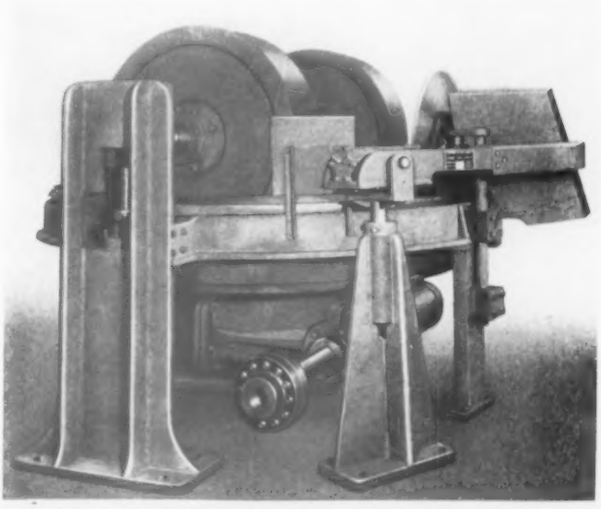
CLEARFIELD *Rotary Pan* SAND MIXERS

Promote

IMPROVED MOLDS
IMPROVED FINISH • MINIMUM REJECTS

The design principle of Clearfield Sand Mixers assures complete agitation and mulling action, thorough tempering and good aeration of all types of foundry sands.

These advantages translate into better, more easily formed molds and cores, improved casting finish, greater dimensional accuracy and fewer rejections. In addition users of Clearfield Sand Mixers report exceptional service life and minimum maintenance.



CLEARFIELD
MACHINE COMPANY

CLEARFIELD
PENNSYLVANIA, U. S. A.

TABOR
TRADE 1884 MARK

JAR SQUEEZERS ★ ★

FOR FAST AND EASY OPERATION

1 TOP SQUEEZE TYPE—Swing head mounted on a ball thrust bearing. Jarring table is centered directly over its support. Furnished in stationary and portable types.

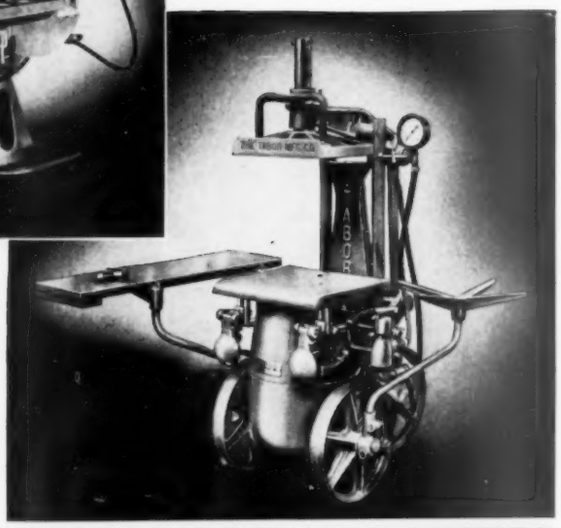
2 CANTILEVER TYPE—A light portable machine with squeeze cylinder in the base. Cantilever squeeze yoke leaves machine open at the sides. Easy movement to and from squeezing position.

3 YOKE TYPE—Squeeze cylinder in base. Open at back to accommodate wide flasks. Counterbalanced spring adjustment for changed weight as yoke is raised or lowered to handle shallow or deep flasks.

4 COLUMN TYPE—10-inch diameter squeeze cylinder in base. Open at sides. Easy swing.

In addition to the standard Tabor machines shown, we also build machines for special work or unusual conditions, combining the functions of different types. Write for descriptive bulletins.

1



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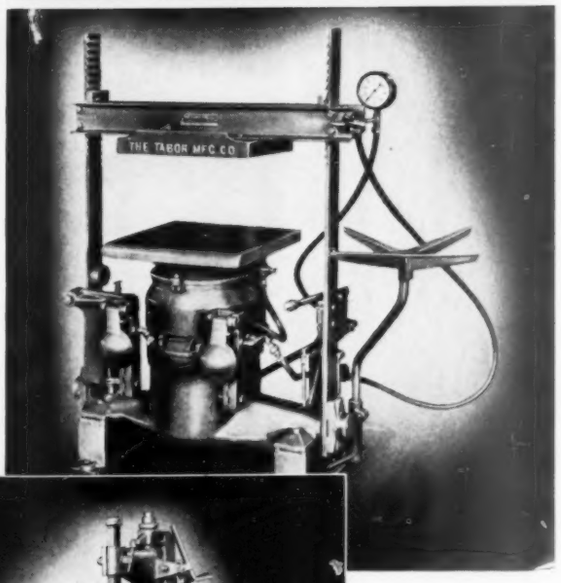

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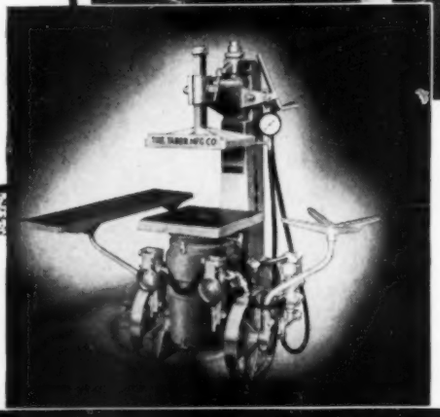


4

THE TABOR MANUFACTURING COMPANY
6225 Tacony Street • Philadelphia • Pennsylvania

Representatives: Snyder Foundry Supply Co., *Los Angeles, Calif.;* Pacific Graphite Works, *Oakland, Calif.;* Carl F. Miller & Co., *Seattle, Wash.*

HE CAN SHOW YOU

HOW to Step Up Production

He's the Republic Pig Iron Metallurgist. He knows irons and foundry practice from both technical and practical standpoints.

He knows the characteristics of the various grades of irons—how they perform in cupola, ladle and flask—and the qualities each produces in finished castings.

He knows foundry operations—from long practical experience in foundries of every type. He is well qualified to study methods and equipment and make suggestions on how to step up production. He knows what causes troubles in castings and how to remedy them when they arise.

He's just the man you need *now*—when every foundry's utmost capacity is needed for *Wartime Production.* And he's ready to roll up his sleeves and tackle the problems in your plant.

When would you like him to call?

REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York, New York

REPUBLIC STEEL — PRODUCTION FOR VICTORY

Republic

PIG IRON

"CHATEAUGAY"
Low-Phosphorus Copper-Free

"REPUBLIC"
(Northern)
Foundry, Basic and Malleable

"PIONEER"
(Southern)
Foundry and Basic

ALSO TRUSCON FOUNDRY FLASKS · REPUBLIC CORE WIRE · FOUNDRY NAILS

A *Real* INVESTMENT FOR MORE PRODUCTION!

DIAMOND FLASKS

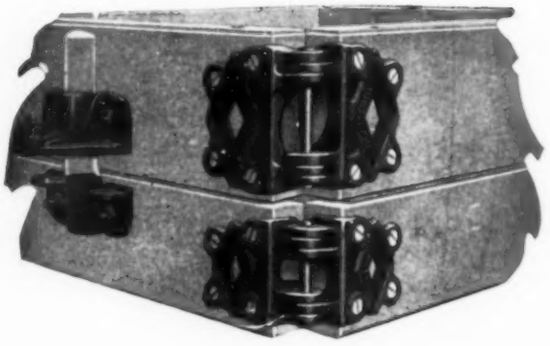
No matter what happens—you'll never be wrong if you equip for production with *good* flasks. Because we can give you many exclusive features in a flask developed over a period of 50 years, it can also be said that, "You can't go wrong on a Diamond," either. Note these important features:

- **A SUPERIOR LATCH (exclusive)**

  It's self-compensating for wear. The tighter you draw it, the firmer the grip. Has special cam which is easily adjustable as extreme wear on parts develops. Only *Diamond* has this patented feature.

- **PRECISION-MADE**

  Made from the finest grade of well-seasoned cherry stock, all flasks are made to precise measurements according to your specifications.



- **A PATENTED HINGE (exclusive)**

  Note the construction of Diamond hinges. The lugs are carefully milled and are interlocking which eliminates "play" no matter how long or how hard the flask is used.

- **SPECIAL SHAPES**

  We regularly supply customers with special shape flasks, including round flasks, and special cut partings.

STEEL JACKETS

Made from Nos. 7 to 10 gauge steel, true to size and taper. Are practically indestructible, and retain their shape under severest conditions. Thousands of these jackets in use.

DIAMOND

CLAMP AND FLASK COMPANY

Telephone 2553 **Richmond, Indiana**

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889

ABRASIVE HEADQUARTERS

DIAMOND and FLINT SHOT— from Ottawa, Illinois. Hard—durable—flint granules of uniform size. Does not split or fracture and can be used many times.

GOLD JACKET—A processed, pure silica sand. Uniformly large round grain. Does not fracture under impact and possesses maximum wearing qualities.

OHIO QUARTZ—An efficient blasting sand made from crushed, washed, dried and screened silica pebbles. A size for every purpose.

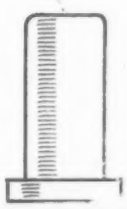
JERSEY SILICA—A sub-angular silica sand, washed, dried and screened to specified sizes.

GLOBE SHOT and GRIT— Thirty-three years experience in the manufacture of metallic abrasives are back of Globe Chilled Shot and Globe Cornered Steel Grit. Scientifically prepared and uniformly controlled for those foundrymen who demand the best.

ALLOY IRON NOZZLES—Varied designs to meet all operating conditions.

STOODY NOZZLES—Hard and wear resistant, they cut blast cleaning costs. Every nozzle guaranteed for 300 hours service and records show most of them last longer.

GREAT LAKES ENGINEERING SERVICE has effected tremendous savings in power, labor, and abrasive costs. Your wire or letter will receive prompt attention.



STOODY
BORIUM NOZZLE

ALLOY
IRON NOZZLE

Great Lakes
FOUNDRY SAND COMPANY—DETROIT
MINERS • PROCESSORS • FOUNDRY, METALLURGICAL AND SAND BLAST SERVICE

FOUNDRY SANDS • SILICA SANDS
SHOT—GRIT—BLAST SANDS
REFRACTORIES • BENTONITE
RE-BONDING CLAYS

The H-B Hydro-Blast
CORPORATION
offers to the American Foundryman
Christmas Greetings
and heartiest good wishes for 1943

Seven years ago The Hydro-Blast Corporation was formed to present a method for cleaning castings and knocking out cores. At that time, the Foundry Industry was reputed to be conservative, in fact, ultraconservative in regard to the reception of new ideas and processes.

We have not found this to be a true appraisal. To be sure, the American Foundryman is rightly concerned with making good castings at reasonable prices. He rightfully feels that the means and methods used to make them are secondary.

On the other hand, all equipment manufacturers should be servants to the Foundry Industry because castings are basic in peacetime and wartime.

The Hydro-Blast Corporation has learned that the Foundry Industry is singularly receptive to new ideas once they have been proved sound. This was true during the less demanding years, long before the needs of war made both the Foundry Industry and its suppliers prime producers of materiel for National Defense, lend-lease, and all-out war.

The Hydro-Blast Corporation thanks every American Foundryman for his patience and cooperation in the development of the Hydro-Blast System of core knock out and casting cleaning. We appreciate your contributions of experience which have enabled us to solve many of the problems of sand practices and sand recovery.

The Hydro-Blast CORPORATION

2550 North Western Avenue • Chicago

HERE'S PROMPT AID FOR CORE-BAKING PROBLEMS

CORE-BAKING problems in scores of foundries have been conquered by Despatch engineers and Despatch core ovens.

This success is chiefly due to experience: learning over a period of 40 years what difficulties are most common, and designing oven equipment accordingly.

Despatch ovens regularly bake more high quality cores per day than was ever possible with older equipment. Each new installation is built to assure greater production in the foundry concerned, using heating equipment and handling system best adapted to that particular job.

Core ovens to fit your special requirements as to size, shape, capacity, fuel and loading devices are available from Despatch. Very prompt delivery.

WIRE OR PHONE TODAY *for a Despatch engineer experienced in foundry production. He will recommend the right oven for better and faster core-baking in your plant.*

Special Core Oven Features For

MAGNESIUM FOUNDRIES Ovens for fast, even, baking of large loads of cores. Special added features for baking cores for magnesium castings.

ALUMINUM FOUNDRIES Many oven models with special loading systems, vertical or horizontal conveyors, etc. Automatic control. Many labor-saving features.

FERROUS FOUNDRIES Core ovens using direct-fired gas or oil heaters. Improved design allows baking cores in ⅓ of time formerly required.

Write for Foundry Oven Bulletin 31-Fnd.

DESPATCH OVEN COMPANY MINNEAPOLIS

STRENGTH

HARDENABILITY

BORON

heightens the useful properties of Quenched Steels

MCA

Newly discovered possibilities of Boron as an alloying element are timely and important. Physical properties till now obtainable only with high percentages of strategic materials, can be satisfactorily produced with less of such materials, by the aid of Boron. Increased hardenability of heat-treated steels is one example. Other qualities of value are likewise obtained. The Molybdenum Corporation of America, producer of alloys and chemicals of Molybdenum, Tungsten, and Boron, invites correspondence. Write for specific information.

AMERICAN Production, American Distribution, American Control—Completely Integrated.

Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.

Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.

MOLYBDENUM
CORPORATION OF AMERICA

Grant Building, Pittsburgh, Pa.

BEST DEOXIDIZER
BEST DEGASIFIER
BEST DENSIFIER

CALCIUM BORIDE

for copper, bronze, ferrous and non-ferrous alloys

Of this, YOU are certain - for sound castings, metals must be completely cleaned of *all* gases and oxides. This requires a very *active* agent.

Of this, WE are certain (from users' testimony) - Calcium Boride, an electric furnace product of Electro Refractories and Alloys Corp., is the most thorough deoxidizing, degasifying and densifying agent. It leaves no residual metal impurities, since it is itself insoluble (disappears in form of slag - after reaction). The fluidity of the metal is not affected. Reactive at normal operating temperatures, Calcium Boride does not, therefore, require excessive super heat.

Furnished in a granular form of 6 mesh or finer.

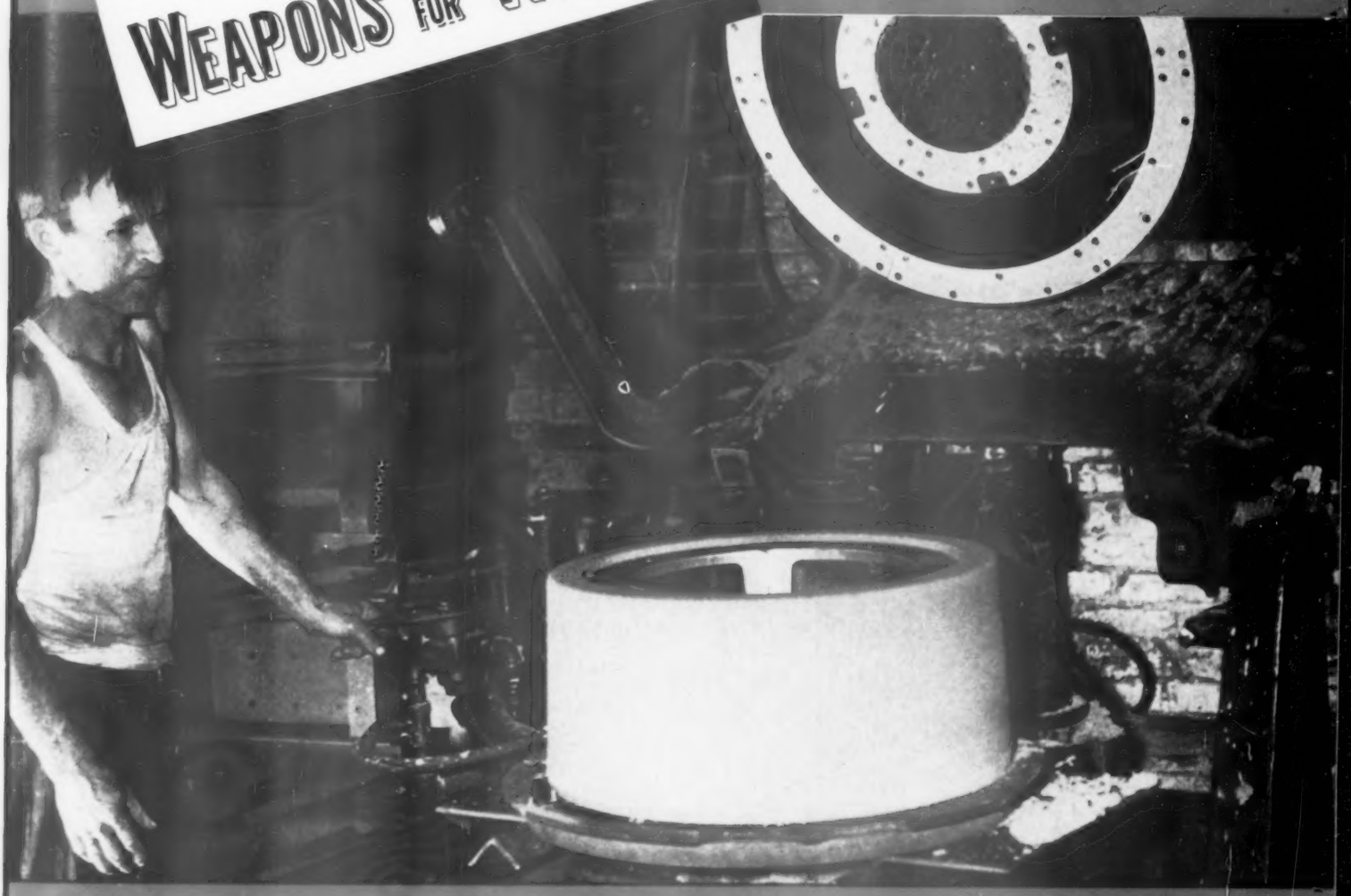
* *Calcium Boride contains no critical or strategic elements and is, therefore, not under W. P. B. allocation. It is, consequently, specified today more than ever to replace critical materials formerly used for the same purpose.*

ELECTRO REFRACTORIES AND ALLOYS CORP.

GENERAL OFFICES: ANDREWS BUILDING, BUFFALO, N. Y.

Manufacturers of Crucibles, Alloys, Stoppers, Refractories, Grinding Wheels

HELPING MAKE WEAPONS FOR VICTORY



Here is an old model "Davenport" molding machine still working night and day producing cores for war work in the Frank Foundries of Moline, Illinois.

DAVENPORT MOLDING MACHINES help build - - Airplanes-Gun Turrets-Tanks Ships and many of the War Weapons . . . .

Throughout America

There is no dimout in the foundries of America. Operating night and day "Davenport" Molding Machines turn out better and faster molds and cores for greater war production of steel, malleable and gray iron castings, also magnesium and other non-ferrous metals.

Today be sure and have your foundry efficiently equipped to meet every war requirement.

Then after the war let's have the foundries of America ready to meet the competitive world market.

"DAVENPORT" LINE OF MOLDING MACHINES

JOLT ROLLOVER DRAW MACHINE
Model SA (Seven sizes)—Capacity from 750 to 12,000 lbs.
Model A (Six Sizes)—Capacity from 1,000 to 12,000 lbs.

JOLT STRIPPER OR PUSH-OFF MACHINES WITH ADJUSTABLE LIFT PINS
Six Sizes—Capacity from 1,000 to 10,000 lbs.

PLAIN JOLT MACHINES—Fourteen sizes—Capacity from 200 to 25,000 lbs.

Write today for our complete catalog showing 33 sizes and models of the modern "Davenport" line.

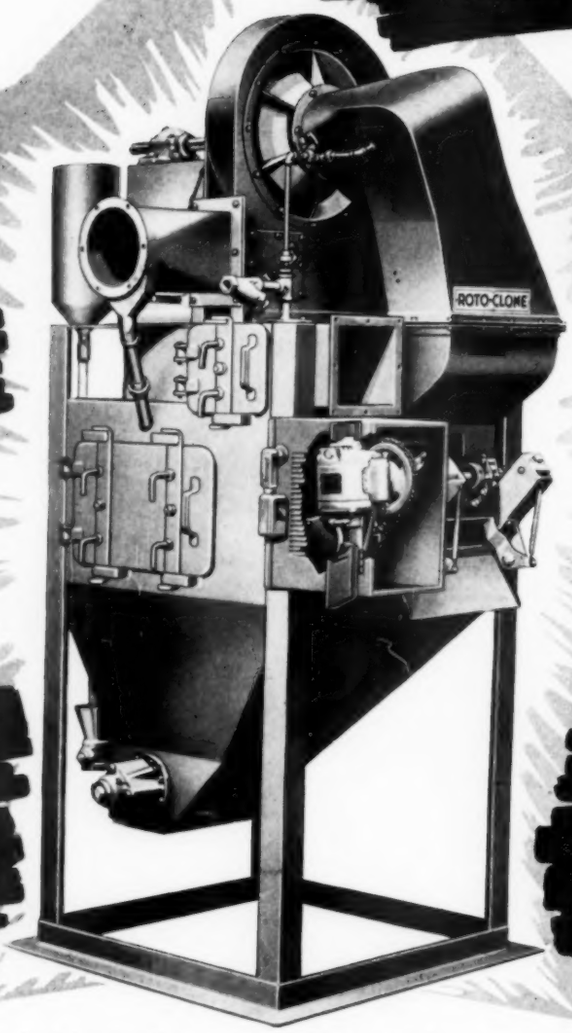
DAVENPORT MACHINE & FOUNDRY CO.
DAVENPORT IOWA, U. S. A.

Why ROTO-CLONE SPEEDS PRODUCTION SCHEDULES

Roto-Clone provides highest efficiency in dust removal over a wider range of particle sizes.

Roto-Clone requires a minimum of space — is a complete unit and requires no auxiliary equipment.

Roto-Clone delivers collected dust as sludge — eliminating secondary dust problems.



Roto-Clone guarantees constant performance at peak efficiency without interruptions for reconditioning or servicing.

Roto-Clone exhausts constant air volumes regardless of dust concentration or presence of steam and fumes.

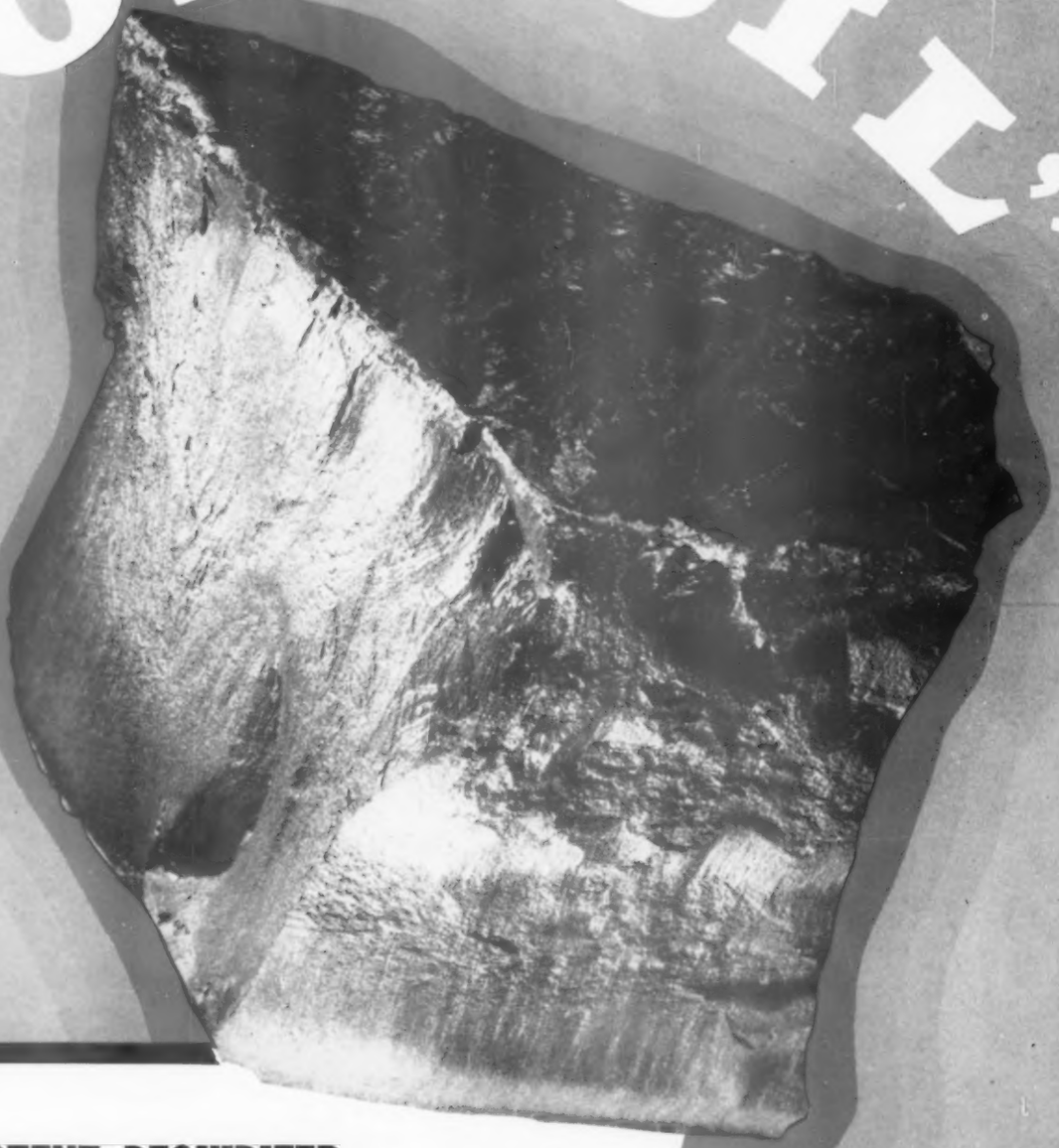
★ Vastly accelerated delivery schedules in all types of war industries have brought dust collection problems to the forefront in production planning. As a result, 3 times as many Roto-Clones were bought in 1941 as were sold in 1940, and the sales-curve goes still higher in 1942. Better than 95% of these have been installed in war production industries.
If you have a process dust problem write for Roto-Clone Bulletins which will be sent without obligation.

AMERICAN AIR FILTER CO., INC.
Incorporated
265 Central Ave., Louisville, Ky.
IN CANADA: DARLING BROS., LTD., MONTREAL, P. Q.

ROTO-CLONE
WATER SPRAY
DYNAMIC PRECIPITATOR

FOR FOUNDRY AAF DUST CONTROL

"BOROSIL"



A POTENT DEOXIDIZER . . .
CONTROLLING DEPTH-HARDNESS

"Borosil", most recent development of Ohio Ferro-Alloys Corporation, is a carefully-proportioned alloy containing 3% to 4% Boron, 40% to 45% Silicon, and balance Iron. The metallurgical possibilities of "Borosil" are remarkable in the extreme.

DEPENDABILITY • PHILO • QUALITY • SERVICE

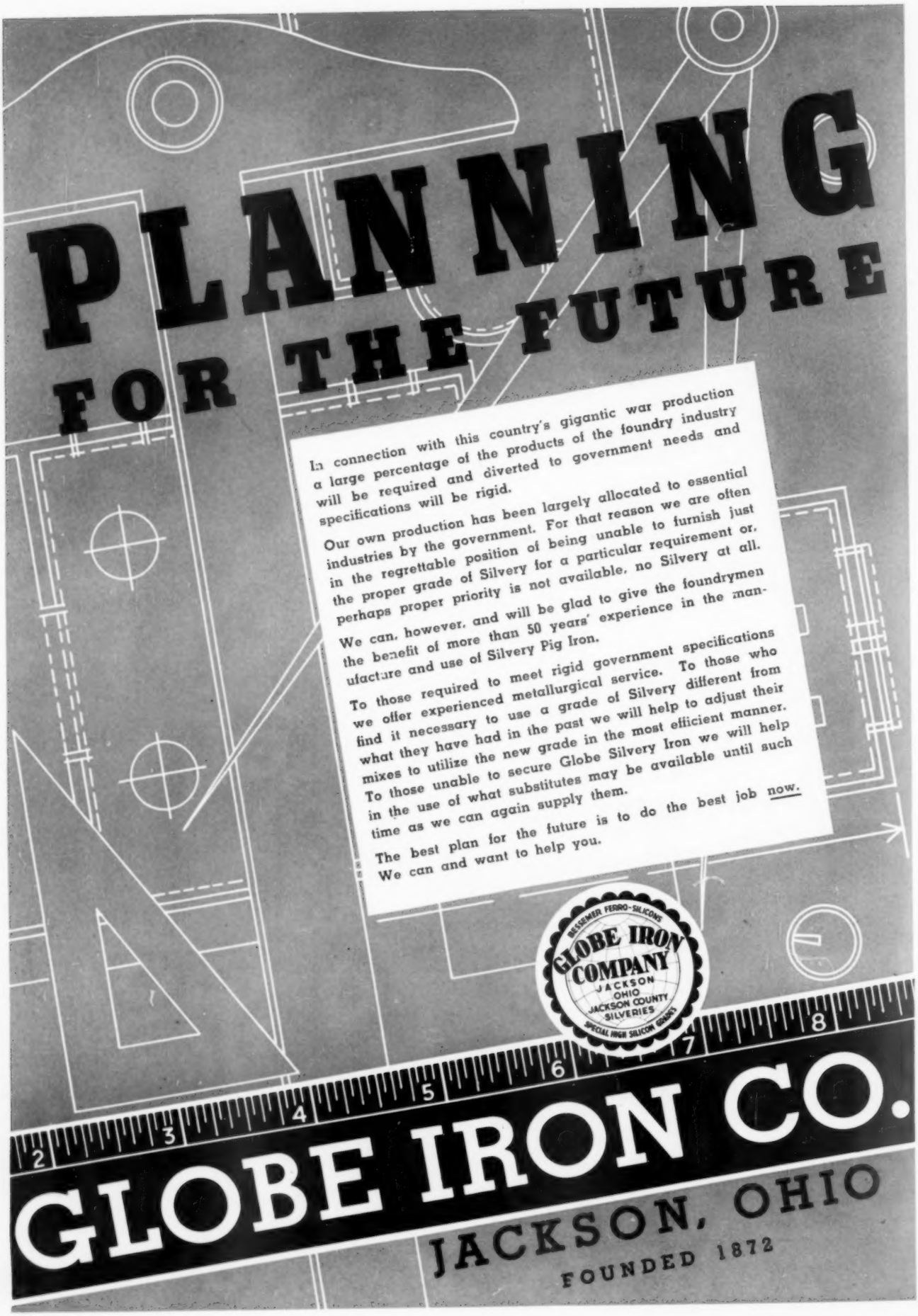
DEPENDABILITY • RAINIER • QUALITY • SERVICE

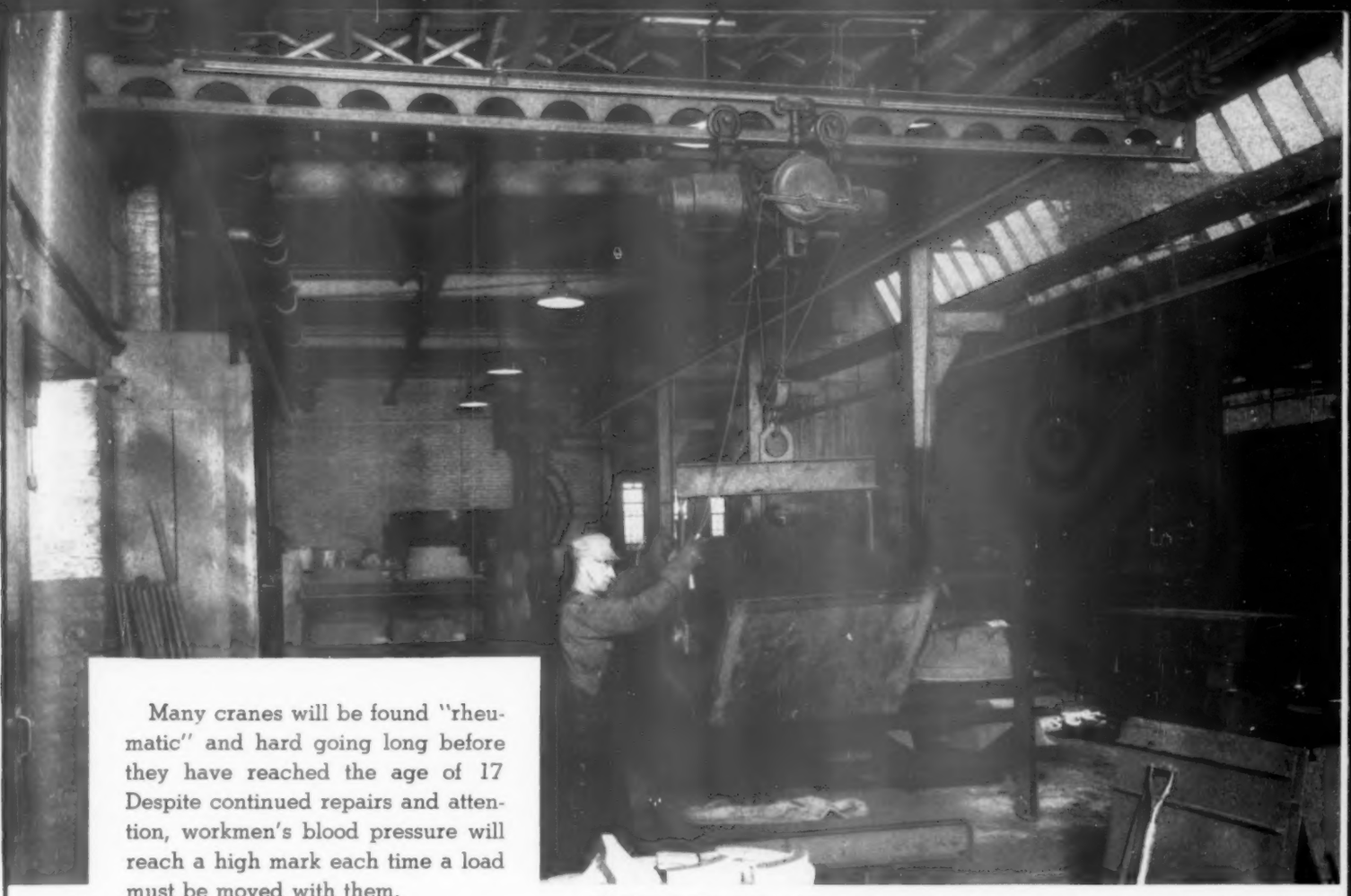
An important folder on the specific properties and general applications of "Borosil" is now available upon request.

Ohio Ferro-Alloys Corporation

Canton, Ohio

Chicago Detroit Pittsburgh Tacoma


PLANNING
FOR THE FUTURE
In connection with this country's gigantic war production a large percentage of the products of the foundry industry will be required and diverted to government needs and specifications will be rigid.
Our own production has been largely allocated to essential industries by the government. For that reason we are often in the regrettable position of being unable to furnish just the proper grade of Silvery for a particular requirement or, perhaps proper priority is not available, no Silvery at all.
We can, however, and will be glad to give the foundrymen the benefit of more than 50 years' experience in the manufacture and use of Silvery Pig Iron.
To those required to meet rigid government specifications we offer experienced metallurgical service. To those who find it necessary to use a grade of Silvery different from what they have had in the past we will help to adjust their mixes to utilize the new grade in the most efficient manner. To those unable to secure Globe Silvery Iron we will help in the use of what substitutes may be available until such time as we can again supply them.
The best plan for the future is to do the best job now.
We can and want to help you.
BESSEMER FERRO-SILICONS
GLOBE IRON COMPANY
JACKSON
OHIO
JACKSON COUNTY
SILVERIES
SPECIAL HIGH SILICON GRADES
GLOBE IRON CO.
JACKSON, OHIO
FOUNDED 1872



This Cleveland Tramrail Crane has been serving The Pohlman Foundry Co., Buffalo, N. Y., with complete satisfaction since it was installed in 1926.

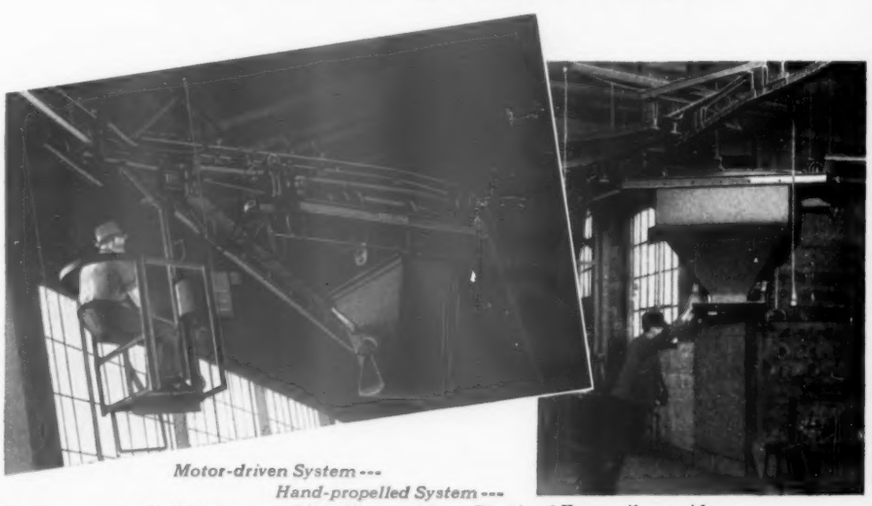
Many cranes will be found "rheumatic" and hard going long before they have reached the age of 17 Despite continued repairs and attention, workmen's blood pressure will reach a high mark each time a load must be moved with them.

To handle thousands of tons of materials year in and year out, as smoothly and easily as the day it was installed, a crane must be quality built throughout. Every part must be correctly designed and perfectly fitted.

It is because Cleveland Tramrail does not skimp on quality that service records of 15 and 20 years are nothing unusual. And most of these cranes will be found on the job another 15 or 20 years from now.

. . . In Service 17 YEARS . . .

and still going strong!



Motor-driven System ---
Hand-propelled System ---
whatever your sand handling problem, Cleveland Tramrail can aid you.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1155 East 283rd St. Wickliffe, Ohio.

GET THIS BOOK!

BOOKLET No. 2008 . . Packed with valuable information. Profusely illustrated. Write for free copy on your company letterhead.

MANUFACTURERS OF • CLEVELAND CRANES • CLEVELAND TRAMRAIL • STEELWELD BENDING PRESSES

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

WAR TIME IS NO TIME TO GAMBLE

PLAY SAFE
with Your Cleaning Room Production

By Fitting Norton Wheels to Your Snagging Jobs

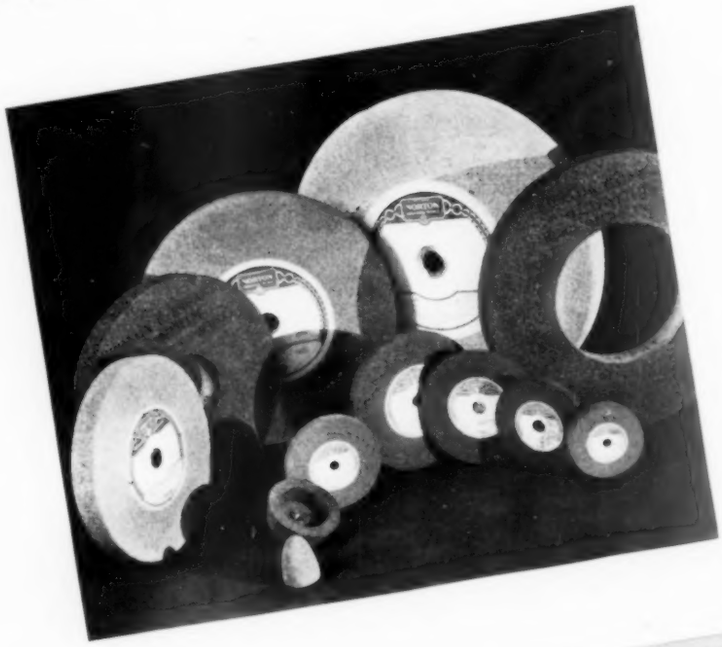
ACCURATE fitting of grinding wheels to their job means more efficient grinding—faster production—more tanks, guns, ships and other armament products. And the complete line of Norton Wheels for the foundry makes accurate fitting *really possible.*

For hard, tough alloy steels there are wheels of tough Alundum abrasive while for softer steels there's the more easily fractured 15 Alundum abrasive. For gray iron, hard malleable and similar castings there is the harder but more brittle Crystolon abrasive.

For high speed snagging with its faster cutting action and better finish there are Norton resinoid and rubber bonded wheels. For use on slow speed machines, especially the severe jobs where pressures are high, there are Norton vitrified bonded wheels.

To help the grinding action and prevent metal from sticking to the cutting points on some types of jobs, several special patented lubricating treatments for Norton Wheels are available.

In your district there's a Norton engineer ready to help you take full advantage of this complete line of foundry wheels—ready to fit them scientifically to your cleaning room jobs for the maximum production now so vital.



NORTON COMPANY
Worcester, Mass.

Distributors in All Principal Cities

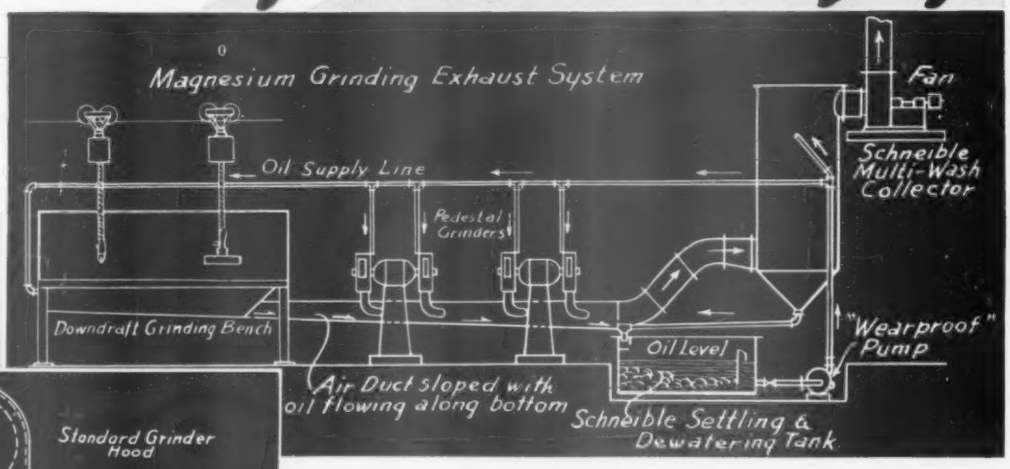
W-858

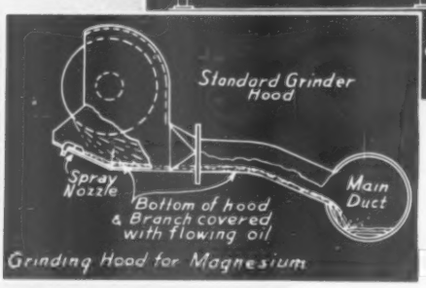
NORTON ABRASIVES

Multi-Wash Systems Remove and Recover Magnesium Dust Safely

At right: complete magnesium foundry grinding system, using downdraft bench and pedestal grinders.

Below: Details of spray nozzle and oil flow in grinder hoods and ducts.




Standard Grinder Hood
Spray Nozzle
Bottom of hood & Branch covered with flowing oil
Main Duct
Grinding Hood for Magnesium

The curse of dust has been lifted from magnesium plant operation and valuable metal is recovered with complete safety by Schneible Multi-Wash Dust Collecting Systems. Many highly efficient Schneible installations have been made in grinding, sawing, burring, polishing and other operations of magnesium foundries.

The Schneible equipment designed for magnesium dust removal is definitely safety equipment with the explosion and fire hazard eliminated. Instead of water (which, in combination with fine magnesium dust forms hydrogen), a high flash point mineral oil is used as the collecting medium. All metallic dust particles coated with this oil are rendered harmless, both in the system and after removal. Normally the oil used is highly loaded waste cutting oil which has outlived its usefulness in the magnesium plant's machine shop. After the magnesium dust has been reclaimed, this oil can be used again as the collecting medium.

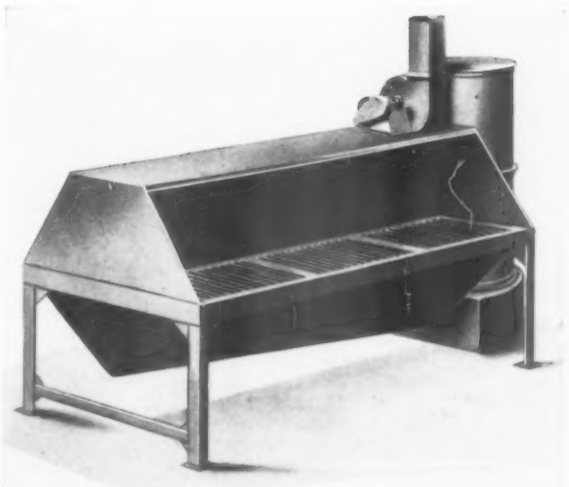
Most heavy particles are captured immediately in an oil bath and flow submerged to the settling tank. The lighter particles are collected in a Multi-Wash Collector, to be deposited in the settling tank. All metal particles can be reclaimed, handled and transported safely.

An oil coated magnesium dust particle is a safe magnesium dust particle.

For dust-creating operations on magnesium castings, we have developed several types of downdraft benches, one of which is shown at the left. Complete Schneible systems to serve the entire magnesium plant are also available.

Schneible Multi-Wash Dust Collecting Systems for magnesium plants provide maximum safety, low initial cost, moderate operating cost, minimum maintenance, complete salvage of magnesium and elimination of the dust handling hazard.

Send for new Bulletin No. 1142 on the application of Schneible systems to magnesium plants.



A Schneible downdraft grinding bench and multi-wash collecto unit. Self-contained and portable. Ideal for all magnesium bench grinding jobs.

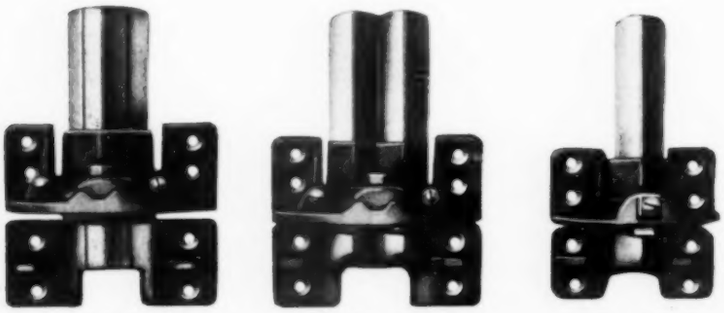
CLAUDE B. SCHNEIBLE CO.
4953 Lawrence Ave., Chicago, Illinois
Offices in Principal Cities

SCHNEIBLE

Adams Cherry Slip Flasks

These flasks are made to your specifications, with any desired length, width or depth. Material is close-grained cherry lumber, with machined malleable trimmings.

The sand strip mechanism is convenient and quick-acting and it will stand up under the squeezing and jolting of power machines. For greatest efficiency, try the Adams Cherry Slip Flask in combination with Adams Jackets.



Wide "V" Double "V" Narrow "V"

Pins to Suit Your Preference

Wide-V pins are furnished unless otherwise specified. We can supply double-V, narrow-V, round or other styles of pins to conform with your present pattern plates.

The Adams Company

1883—Our 60th Year—1943

800 Foster St., Dubuque, Iowa

MOLDING MACHINES ADAMS FLASK EQUIPMENT

SWINDELL

ELECTRIC ARC MELTING FURNACES

Featuring
EXCLUSIVE INTEGRATED CONSTRUCTION OF SWINGING ROOF MECHANISM—
PROVIDING GREATER STRENGTH, SIMPLICITY, and CAPACITY . . .

MATCHLESS ADVANTAGES . . . SERVING URGENT NEEDS!

M DEFENSE PHOTO by Palmer

SWINDELL-DRESSLER *Corporation*

DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES

PITTSBURGH, PA.

WHEELS of PROGRESS *for 1943*

GRINDING WHEELS, now more than ever, demand the most careful selection. Conservation should be the ever-watchful password in every foundry, toolroom, factory grinding department or machine shop.

We are at your command day and night, to make certain that of the hundreds of grit — hardness grade — and porosity combinations, your selection will be the one that will give you a greater and more rapid production with the maximum amount of grinding efficiency at a minimum cost.

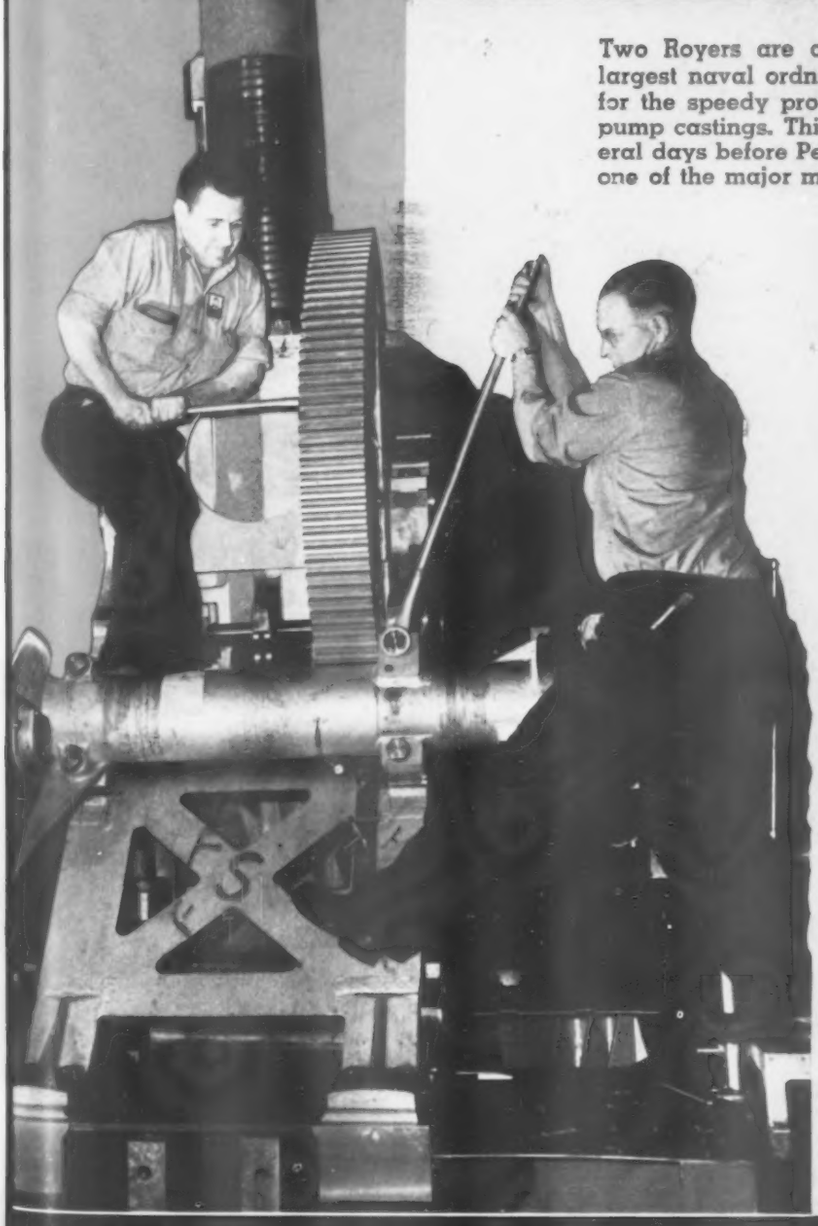
BAY STATE WHEELS of PROGRESS

CONTROLLED POROSITY, FRACTIONAL GRADES, H9 VITRIFIED BOND, three of our many outstanding features, assure a definite start in this direction. Consult BAY STATE and be sure!

BAY STATE

ABRASIVE PRODUCTS CO., WESTBORO, MASS. U.S.A.

Royers Speed Production at Large Ordnance Plant



Two Royers are at work in the nonferrous foundry of one of the largest naval ordnance plants in the United States conditioning sand for the speedy production of nonferrous gun, elevator and hydraulic pump castings. This plant had turned out its first 500 naval guns several days before Pearl Harbor. Its subsequent output record is rated as one of the major miracles of American war industry. Naturally, Royer is proud of its part in such performance.

The nonferrous castings used in naval ordnance work must meet extremely rigid specifications. Every step in their production must be above standard, sand preparation included. For this function a model NB-2 and NC-4 Royer are used.

Wherever high speed casting production must be combined with high quality, you are more than apt to find Royer Sand Separators and Blenders on the job. Royers speed production and take the problem of sand conditioning off the minds of foundry operators.

Only Royers assure this proper six point sand conditioning:

1. Thorough refuse removal
2. Positive lump breaking
3. Complete blending and mixing
4. Even distribution of moisture
5. Increased permeability
6. Double aeration — once on the belt and once on the discharge

There's a portable or stationary Royer to meet the needs of every foundry: capacities up to 50 tons per hour; and two combination scrap remover models for large jobbing shops.

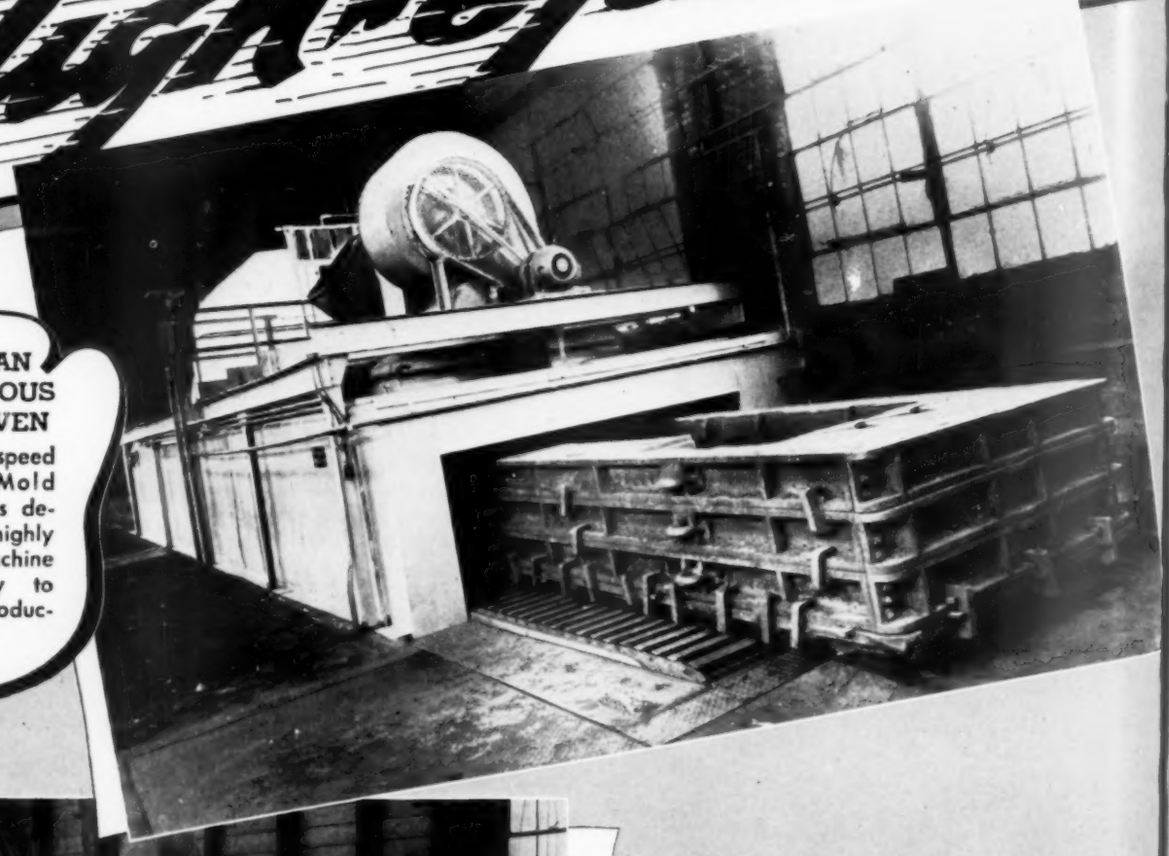
Write for full information on operating economies and delivery dates on your priority requirements.

ROYER FOUNDRY & MACHINE CO.
159 Pringle St., Kingston, Pa.

THE ROYER

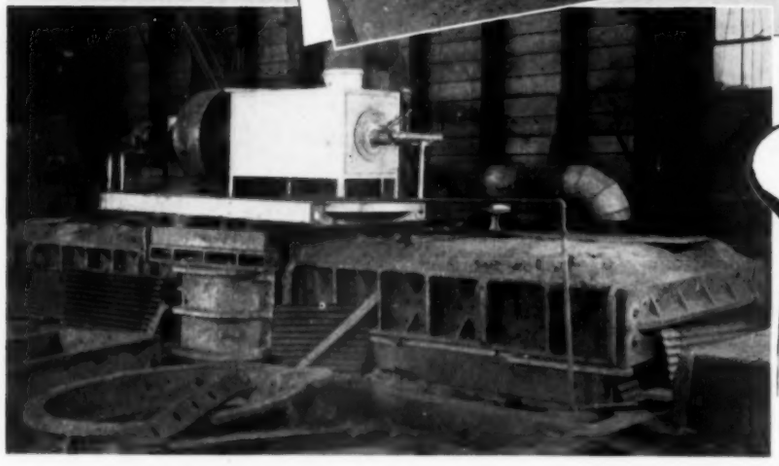
ROYER FOUNDRY & MACHINE CO. *KINGSTON, PA.*

High-Speed



COLEMAN CONTINUOUS MOLD OVEN

Eleven high-speed Coleman Mold Ovens of this design enable highly modern machine tool foundry to break all production records.



COLEMAN PORTABLE MOLD DRYER

Built in wide range of sizes, gas or oil fired, for high speed drying of mold interiors. Better and faster drying, with savings up to 75% over former methods.

COLEMAN

MOLD DRYING

War production requirements have brought out many new and improved production methods. No single development has contributed more to increased foundry production in the medium and heavy shops than has the Coleman System of High Speed mold drying.

You can now obtain the advantages of dry sand mold practice in a fraction of former mold drying time. Whether your work involves large scale continuous production or the drying of relatively few large or medium size molds, Coleman Mold Drying Equipment will provide amazing economies.

COLEMAN
CAR TYPE OVENS
For drying molds or baking heavy cores. Built in wide range of sizes for operation with gas, oil, coke or stoker coal.

There is a right type and size of Coleman Oven for every core-baking and mold-drying job.

COLEMAN.....Portable Ovens
COLEMAN.....Rolling Drawer Ovens
COLEMAN.....Transrack Ovens
COLEMAN.....Car Type Ovens
COLEMAN.....Tower Ovens
COLEMAN.....Horizontal Conveyor Ovens.

OVER 7,000 SUCCESSFUL INSTALLATIONS DURING THE PAST 37 YEARS!

Write for Folio of Bulletins

THE FOUNDRY EQUIPMENT CO.
BUILDERS OF COLEMAN AND SWARTWOUT OVENS
CONTRACTING ENGINEERS AND MANUFACTURERS
CLEVELAND, OHIO

CORE and MOLD OVENS

UNIFORM DRYING—*Faster!*

with MAHR *portable* MOLD DRYER

- **HEAVY STEEL CONSTRUCTION**
- **FAST HEAT-UP QUICK DRYING**
- **FOUR SIZES:**
  - 250,000 Btu Capacity
  - 500,000 Btu Capacity
  - 750,000 Btu Capacity
  - 1,250,000 Btu Capacity
- **OIL OR GAS FIRED**
- **PORTABLE**

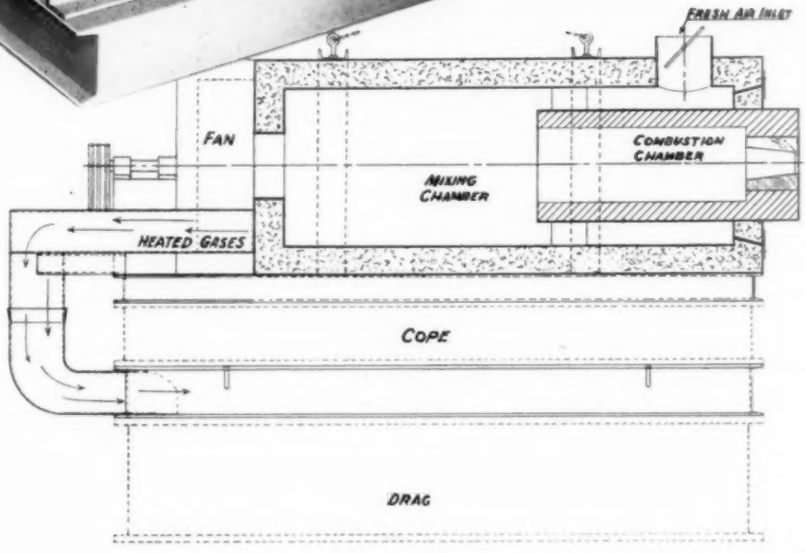
MAHR
ENGINEERS • DESIGNERS • MANUFACTURERS
ALL EQUIPMENT FOR METAL HEATING

Large, cumbersome molds are difficult to handle in drying, yet proper and quick drying is one of the most important elements in producing a good casting After long and exhaustive study and tests of many drying methods in our own and other foundries, we are proud to announce this newest member of an old family.

Designed by an organization long experienced in industrial heat application, and thoroughly tested under everyday foundry conditions with outstanding performance results. Heat-up time is extremely fast. Large volumes of hot gases are forced into every part of the mold for fast, complete drying. Normal drying times are shortened.

The entire unit is mounted on a heavy channel steel frame, and can be quickly moved and set up for use on any large mold. Fuel may be either gas or oil. Economy in operation is one of its features because of rapid and complete combustion.

FOR OVER A QUARTER CENTURY, the name MAHR has been associated with industrial heat equipment of quality and the most modern design. These products include CORE AND MOLD OVENS, FURNACES OF ALL SIZES AND TYPES FOR ANNEALING, STRESS RELIEF, ETC., FORGES, TORCHES, BURNERS, BLOWERS AND VALVES.



WRITE, WIRE, OR PHONE FOR BULLETIN AND PRICES

Get our fully illustrated and descriptive bulletin telling all about this dryer It can be used nearly every day in any foundry. With sub-contracts for many very large castings today, several foundries are already using batteries of these dryers with a great saving in time and costs. Write, wire or phone TODAY for complete information.

★ *Save ALL your scrap!* ★

Sales Offices in Principal Cities

MAHR MANUFACTURING CO.
DIVISION OF DIAMOND IRON WORKS, INC.
1709 NORTH SECOND STREET • MINNEAPOLIS, MINNESOTA, U. S. A.

★ *Buy MORE War Bonds!* ★

IT'S ALMOST LIKE MAGIC

YOU CAN NOW PUT THROUGH

5 BATCHES

in the time it used to take for only 1 batch

Automatic Star-return

RANSOHOFF TUMBLING MILLS

THE RANSOHOFF METHOD EXCELLS BECAUSE:

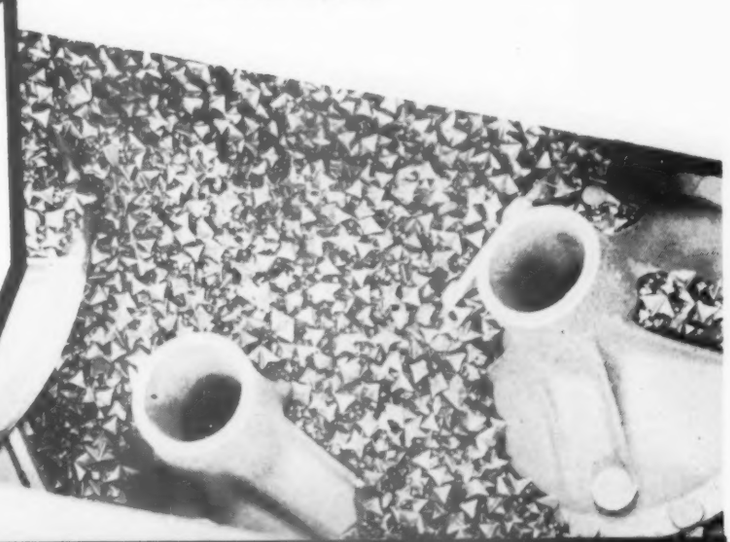
Castings cascade in a mass in which stars are intermingled thoroughly, filling all voids completely. This results in very rapid cleaning without nicking, breaking or excessive mill wear. Stars enter and return automatically. Health hazards due to dust are eliminated.

The life-photo tells the story: note the use of a completely enveloping mass of stars which cascade intermingled with the work. Stars vary from tiny little fellows to big burly stars of about one inch. No nicking, breaking or excessive mill wear. You save time, labor and costs.

Malleable differential housings after annealing are being tumbled, as shown in illustration.

RANSOHOFF TUMBLING MILLS — Speedy, gentle . . . automatic handling of stars . . . low maintenance cost.

Write for details.

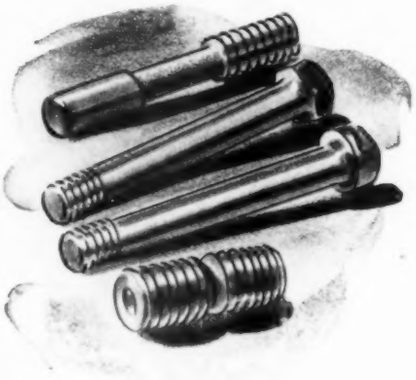


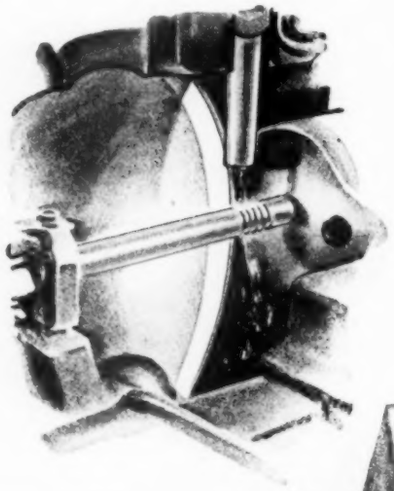
N. RANSOHOFF, Inc. CINCINNATI, OHIO
Township Ave. and Big 4 R. R.

He flies a plane held together with threads!

At 400 m.p.h. a fighter pilot's life literally hangs by a thread. For the bolts and studs which help hold his engine and plane together are only as strong as their threads. Fortunately those threads can be counted on to hold. A special grinding process makes them far safer and stronger today than they would have been a few years ago. In this process, Carborundum-made grinding wheels play an important role.

The method of grinding produces threads of almost unbelievable accuracy, free from microscopic checks and cracks which might cause failure under stress. This greater accuracy justifies a smaller safety factor, reducing weight of dead metal. And in most cases, production is speeded and costs reduced.



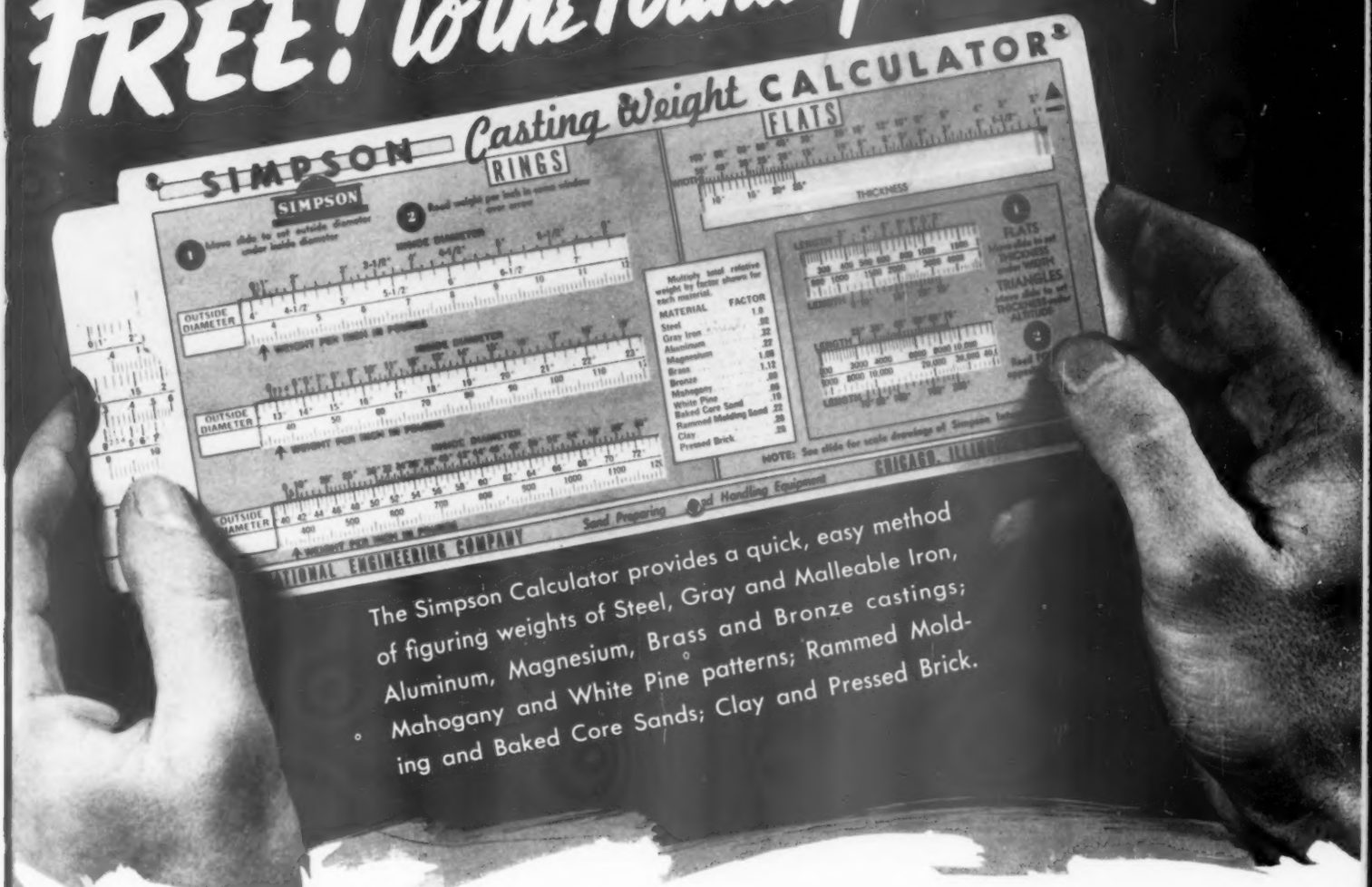


Thread grinding is typical of the many ways in which products and processes developed by Carborundum are serving America by helping industry do a better, faster job at lower cost. The Carborundum Company, Niagara Falls, New York.

CARBORUNDUM
REG. U.S. PAT. OFF.
ABRASIVE PRODUCTS

Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company.

THIS CALCULATOR FREE! to the Foundry Industry



The Simpson Calculator provides a quick, easy method of figuring weights of Steel, Gray and Malleable Iron, Aluminum, Magnesium, Brass and Bronze castings; Mahogany and White Pine patterns; Rammed Molding and Baked Core Sands; Clay and Pressed Brick.

NATIONAL Engineering Company has developed the Simpson Casting Weight Calculator to help you save time in figuring weights for all kinds of metal castings and for metal and wood patterns. The Simpson Calculator takes the guesswork out of weight estimating — it is easier to use and takes less than one-third the time required to estimate weights with conventional methods.

In using the Simpson Casting Weight Calculator, complicated castings are divided into simple components of rectangles, triangles and rings. Figured separately and added together, these components give the total weight of the casting.

The simple instructions for use of the calculator are given on the reverse side, along with convenient tables for millimeter and decimal equivalents.

Send the coupon today, or request your calculator on your company letterhead. The supply is limited.

SIMPSON
INTENSIVE MIXERS

Mail this Coupon TODAY!

NATIONAL ENGINEERING COMPANY
551 W. Washington Blvd., Chicago, Ill.
Send your Simpson Casting Weight Calculator to:

Name_____

Company_____

Title_____

Type Foundry_____

Address_____

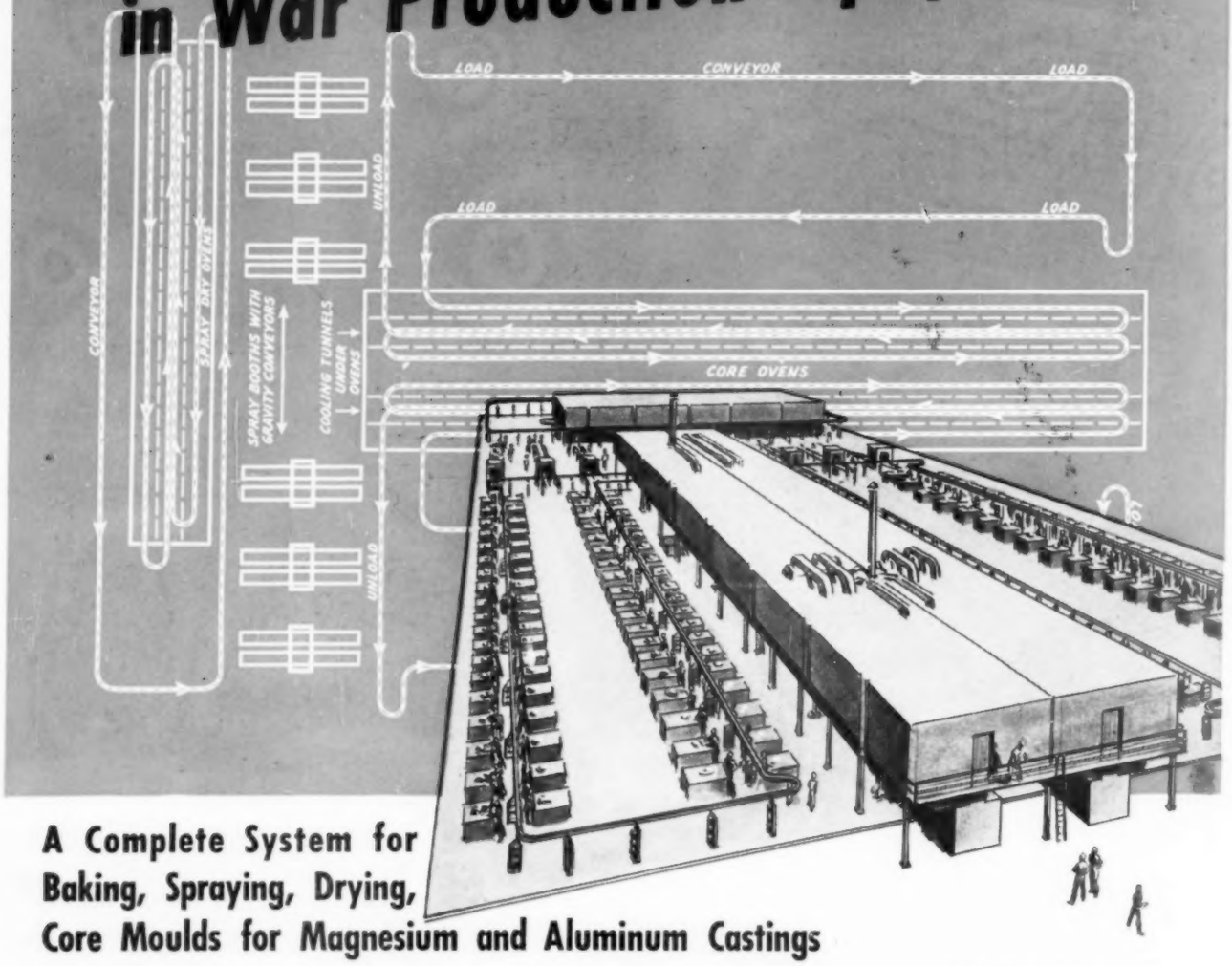
City_____ State_____

NATIONAL ENGINEERING COMPANY

551 W. WASHINGTON BLVD. • CHICAGO, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries:—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Ltd. Sydney, Australia

Another MAHON ACHIEVEMENT in War Production Equipment



A Complete System for Baking, Spraying, Drying, Core Moulds for Magnesium and Aluminum Castings

One of the largest core baking and finishing systems ever conceived has been developed by Mahon engineers for a foremost builder of aircraft engines. It makes possible the pouring of *thousands of castings each day.* The section pictured is but one of four compact units. Each unit is in reality two complete systems—having twin ovens, twin cooling tunnels, twin batteries of spray booths and twin drying ovens—through which the work from 8 lines of core-making machines, 20 to a line, continuously travels on a series of conveyor systems. Except for loading and unloading the conveyors, operation is entirely automatic. Method of transporting moulds, temperatures, ventilation, spray-painting of moulds, all have been carefully worked out to insure moulds emerging from final drying oven without breakage or loss en route.

Let Mahon Engineers Help You!

The tremendous volume and speed-up of war production is constantly presenting new problems in the FINISHING of war products. If you have such a problem let Mahon engineers help you. Manufacturers are finding Mahon's thorough understanding of modern finishing methods extremely invaluable in meeting constantly increasing production schedules—with constantly decreasing manpower.

THE R. C. MAHON COMPANY • DETROIT • CHICAGO

MAHON

Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of All Types, Filtered Air Supply Units, Hydro-Foam Dust Collectors—and Many Other Units of Special Production Equipment—including Complete Finishing Systems.

How we can help you meet your *Ferro-Alloy Requirements*

"Electromet" Ferro-Alloys and Metals for the Cast Iron Foundry

Added to the Cupola	*Result*
"EM" Silicon Briquets (round)	Deoxidize and aid machinability by graphitizing effect. Reduce chill in light sections. Permit easy control of silicon additions.
"EM" Chromium Briquets (hexagonal)	Increase hardness, wear resistance, corrosion resistance, and heat resistance. Promote greater density. Permit easy control of chromium additions.
"EM" Silico-Manganese Briquets (square)	Act as a scavenger. Harden iron when added in large quantities. Permit easy control of manganese additions.
Added to the Ladle	*Result*
85% Ferrosilicon 50% Ferrosilicon	Deoxidizes and aids machinability by graphitizing effect. Reduces chill in light sections. (85% grade used for large additions.)
Silicon-Zirconium	Deoxidizes and graphitizes, improving density of iron.
Ferromanganese-Silicon	Combines graphitizing influence of silicon with scavenging action of manganese.
Ferromanganese	Acts as scavenger. Hardens iron when added in large quantities.
Foundry Grade S.M. Ferrochrome	Increases hardness, wear resistance, corrosion resistance, and heat resistance. Promotes greater density.
Ferrovanadium	Refines grain (of value particularly in improving impact strength of hard irons).
"SMZ" Alloy	Converts normally hard iron into high-strength gray iron. Reduces chill. Improves strength and physical properties.

"Electromet," "EM," and "SMZ" are registered trade-marks of Electro Metallurgical Company.

UNDER present conditions, perhaps you can't get all the ferro-alloys you want in the grades you are accustomed to using. If so, it may be necessary for you to modify your practice to use alloys that are available. You may be able to substitute available standard sizes and analyses for special grades. You may be able to use a different combination of deoxidizers to achieve the same result. Or perhaps you can change the composition of your iron to take advantage of alloys that are available, and still obtain equally good physical properties.

With the knowledge gained through 35 years' experience in the manufacture and use of ferro-alloys, we may be able to suggest what you can substitute and how you can change your practice to

get the results you want. Our metallurgists can give you practical, on-the-job help. Ask for this service to help meet your ferro-alloy requirements. No obligation is involved.

Electro Metallurgical Company
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, N. Y.

"Electromet" Ferro-Alloys and Metals are distributed through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

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Trade Mark
Ferro-Alloys & Metals

Increase Production with
ROTOPLANE Speed Sifters

"Hard-to-Please" Foundries Standardize on Rotoplane!

ORDER FROM YOUR FOUNDRY SUPPLY HOUSE

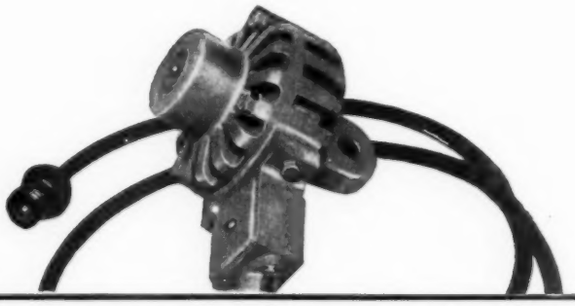
Try ROTOPLANE in your plant. You, too, will find it increases production, does *all* your sifting more quickly and economically. One size and type for all sifting jobs.

ROTOPLANE is built for long, dependable service. Strong, one-piece frame gives remarkably effective vibration. Smooth, free, rotary action. All mechanism completely enclosed and dustproof. Weight approx. 90 lbs., 62 in. high overall.

Steel-mounted sieves instantly interchangeable. No jagged screen edges, no storage problem. 20 in. diameter clear sifting area.

TEN DAYS FREE TRIAL.

$175.00 f.o.b. Chicago—complete with cable, safety ground wire, one sieve (2-4 mesh). Standard ⅓ h.p. motor, 115-230 volts 60 cycle single phase.
Prices with other motors quoted on request.



ELECTRIC VIBRATORS

True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

(All Prices f.o.b. Chicago)

No. 1—Light match plate work..... $10.00	No. 5—Heavy match plate, tub, bench $17.00
No. 2—Medium match plate 13.00	No. 9—Machine and heavier 24.00

FOUNDRY SUPPLIES MANUFACTURING CO.

2221 Orchard Street — Chicago, Illinois

CABLE ADDRESS: "ROTOPLANE CHICAGO"

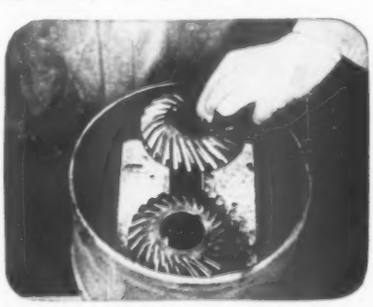
NEW LINDBERG MOVIE OFFERS MANY PRACTICAL

FOR HEAT TREATERS!

The "Second Edition of Heat Treating Hints" will be available for booking on February 1st, 1943. This 16mm, color and sound, film shows 45 minutes of valuable heat treating tips, such as:

A simple method of scale-free hardening when an atmosphere furnace is not available ★ A number of basic quenching suggestions ★ Scale-free hardening of tools and dies in a molten boric acid bath ★ How to shrink a draw ring back to serviceable life after having been worn beyond useful tolerance ★ The old blacksmith trick of tempering springs by igniting the adhering quench oil ★ The problems of the "most promising apprentice" when he tries some of the jobs in the shop.

You will see many other practical, useable suggestions on heating, quenching and straightening presented by the editors of "Heat Treating Hints," the publication.



A simple method of scale-free hardening when an atmosphere furnace is not available.

OUR STUDIO The scenes were laid in the world's largest commercial heat treating plant, where more than 5,000,000 pounds of metal are handled each month. The actors are the men who supervise the treating of this tremendous volume of work. You will see them at the furnaces, quench tanks and straightening presses, going through each problem, step by step.

WHO SHOULD SEE THIS FILM . . . heat treaters, metallurgists, tool and die makers and designers, superintendents, plant managers and trainees in the metal working industry. Anyone who works with metals will have a much better appreciation of the problems of heat treatment *and the solutions to many of them.* The film is purely educational and *contains no advertising.*

Scale-free hardening by protecting the surface with molten boric acid.

Shrinking a draw ring back to serviceable life after having been worn beyond useful tolerance.

LOANED WITHOUT CHARGE Both the First and Second Editions of the "Heat Treating Hints" movie are loaned without charge to any interested group. Write today for the folder giving details on how your plant or society may obtain this educational, entertaining film.

HEAT TREATING HINTS
FIRST EDITION

To date, this 16 mm, color and sound film has been shown in over 150 cities in the United States and Canada to audiences totalling more than 65,000 people. Prints have been purchased outright for training purposes by branches of our armed forces.

The First Edition is still available for booking. See it, as well as the Second Edition. Both are complete, instructive, entertaining units with no duplication of scenes.

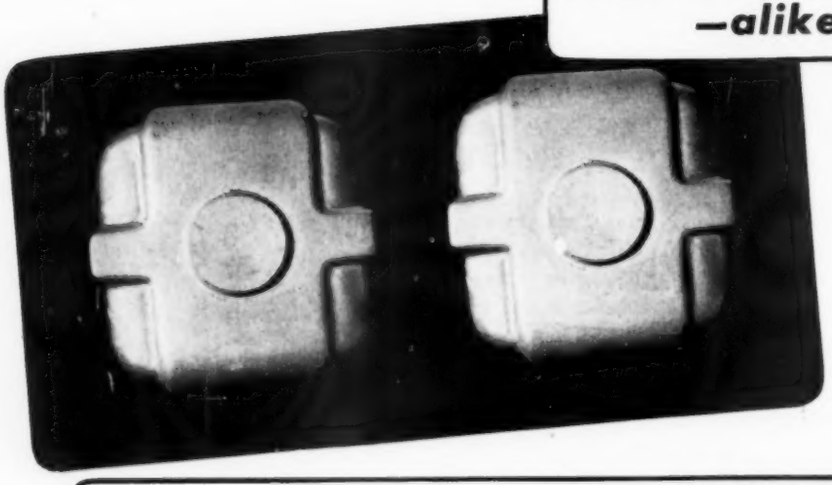
LINDBERG ENGINEERING COMPANY
2453 WEST HUBBARD STREET • CHICAGO

LINDBERG FURNACES

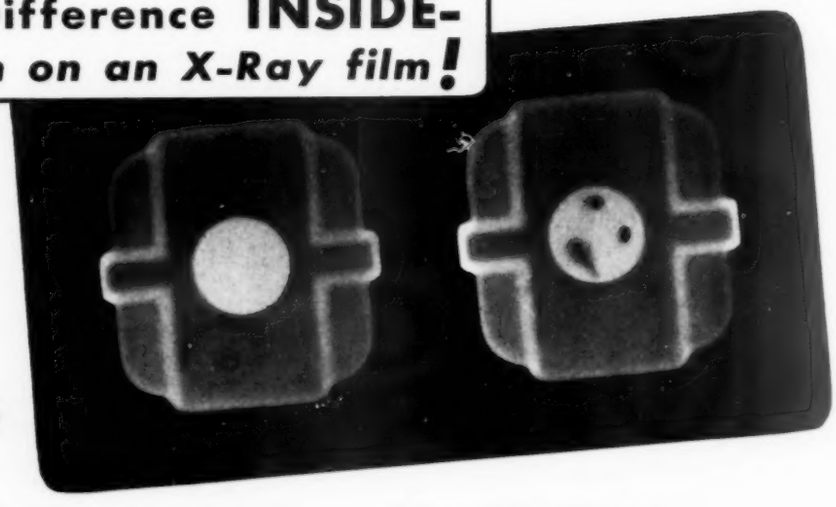
SUPER-CYCLONE FOR HARDENING, NORMALIZING, ANNEALING, NITRIDING AND TEMPERING
HYDRYZING FOR SCALE-FREE AND DECARB-FREE HARDENING
CYCLONE FOR ACCURATE, LOW COST TEMPERING

The X-Ray Story of TWO CASTINGS!

From The OUTSIDE—
—alike as two peas!



But what a Difference INSIDE—
as shown on an X-Ray film!



KELEKET X-RAY

INDUSTRIAL X-RAY

THESE pictures tell an amazing story. At the top are shown two castings both from the same mold — apparently identical and both acceptable upon a surface inspection.

However, X-ray inspection shows that one is free from defects and practically perfect, but the other shows gas pockets which should mean immediate rejection! Thus, X-ray inspection saves costly machining as well as the possibility of an expensive break-down in use.

KELEKET Industrial Units are now being used by many industrial plants for making X-ray inspection radiographs—both in the laboratory and in the production line. Harnessed to war production, these units save time and money — and improve quality!

There is a KELEKET X-ray machine for every industrial use, from the inspection of the lightest aluminum sheets up to 5-inch steel, and these machines will detect flaws as small as 1% of material thickness.

Consult KELEKET engineers for information concerning X-ray inspection for your requirements.

THE KELLEY-KOETT MFG. CO., Industrial Division, 2271 West Fourth Street, Covington, Ky.

Representatives in 64 Cities

PIONEER CREATORS OF *QUALITY* X-RAY EQUIPMENT SINCE 1900

FIELD MEN — READY TO WORK WITH YOU

in meeting

1943 PRODUCTION REQUIREMENTS

CHANGING CONDITIONS on the fighting fronts will mean changes in armament production in 1943. Processing operations will have to be converted rapidly to meet new needs. In getting the job done, there are many ways in which Newcomb-Detroit engineers and erection crews can offer invaluable assistance.

Since 1912, Newcomb-Detroit men have not only designed and manufactured spray booths, ovens, metal parts washers, dust collectors, ventilating systems and other types of sheet metal equipment but have also assumed complete responsibility for erection and efficient operation.

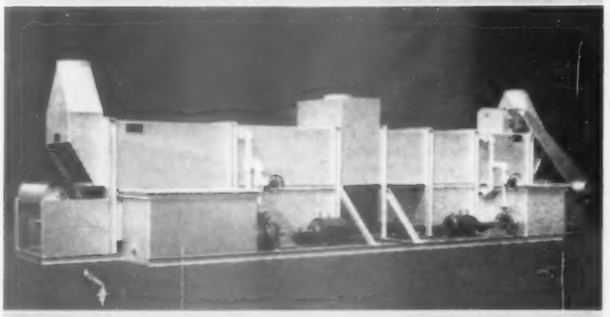
In many cases, existing equipment and systems can be changed over to meet new requirements. Newcomb-Detroit field men have the experience and ability to recommend how such conversions can be accomplished in minimum time and at lowest cost. If additional equipment is necessary, Newcomb-Detroit engineers and production men have the "know how" to design and build the units or systems best suited for any specific process.

The services of the Newcomb-Detroit organization are available to you. They may offer the solution to many of your problems in the near future. We'll be glad to supply full information on what we are equipped to do for you.

SPRAY BOOTHS

DRYING OVENS

METAL PARTS WASHERS



DUST COLLECTORS

. . and other sheet metal equipment for industrial purposes

NEWCOMB-DETROIT COMPANY, INC.

5751 RUSSELL STREET *Established 1912* **DETROIT, MICHIGAN**

Dust Collectors • Paint Spray Booths • Drying Ovens • Metal Parts Washers and Rust Proofing Systems • Exhaust and Ventilating Systems • Other Sheet Metal Equipment

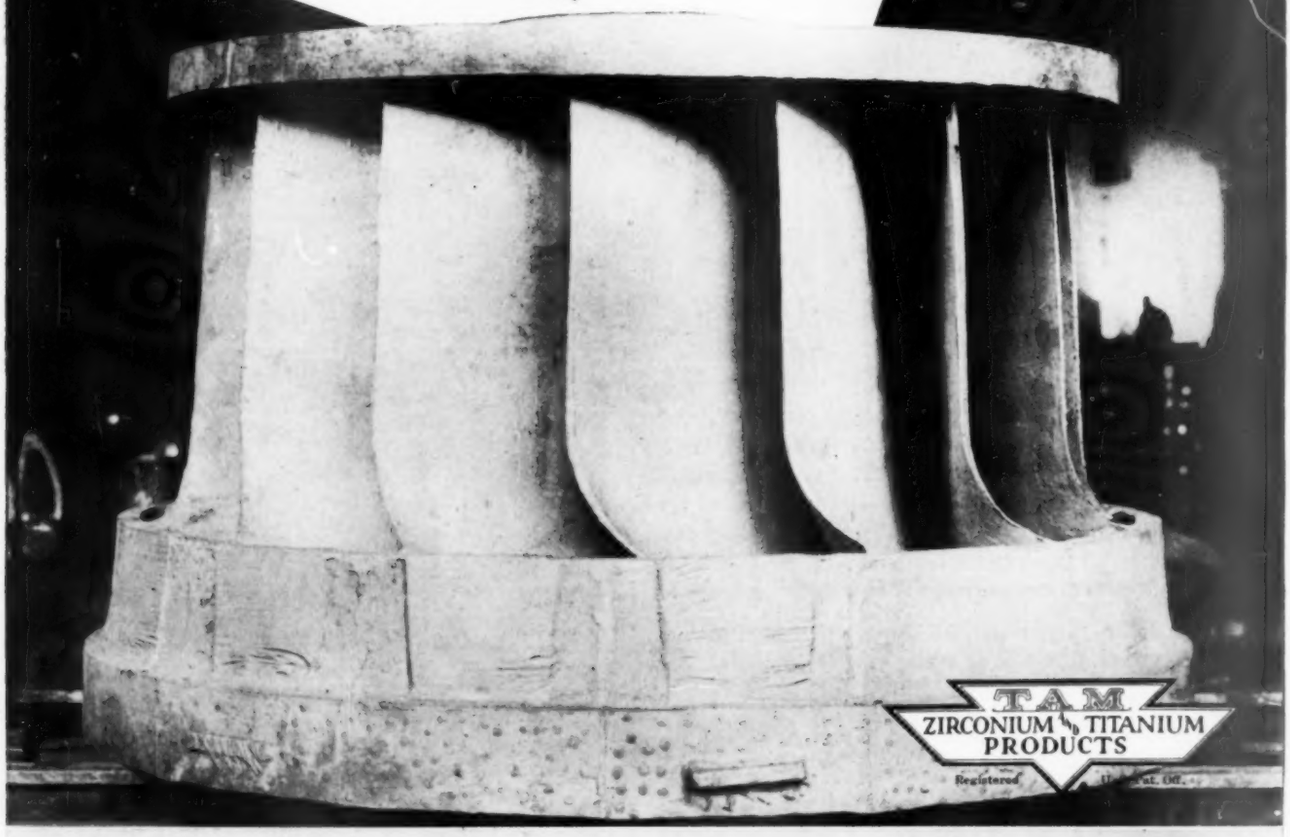
SMOOTH FACES FOR CASTINGS

TAM Zirconite super-refractory mold and core washes produce smoother surfaces and reduce cleaning costs

By resisting the burning-in of the molten metal, TAM Zirconite Mold and Core washes speed up output of good castings by reducing the number and time of cleaning and finishing operations. Available in three grades: Zirconite A has a melting point above 3775° F.; Zirconite B has a melting point above 3600° F.; and Zirconite C, for special uses, has a melting point above 3600° F. They are quickly mixed by adding to water, and can be applied by either spraying, swabbing or painting on cores and molds. Write for complete details, today.

TITANIUM ALLOY MANUFACTURING COMPANY

Zirconite Wash was used on this 94,000 pound .30-.35 carbon steel casting—11'6" high 14' diameter. Of special intetest is the fact that no nails were used in the facing.



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ZIRCONIUM TITANIUM
PRODUCTS
Registered U.S. Pat. Off.

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There's a Hidden Gold Mine in your USED CORE WIRE!

RECLAIM IT WITH KANE & ROACH CORE WIRE STRAIGHTENERS

Savings up to $150 a month are often reported by enthusiastic users of Kane & Roach Core Wire Straighteners! Don't neglect this hidden source of cash! Your used wire—even if it's badly bent—can be restored over and over again with these fast-working, economical machines. Now—when conservation of all metal is a vital factor in war-industry, Kane & Roach Straighteners fulfill a more important need than ever. Kane & Roach machines not only save valuable core wire but they pay for themselves so fast that scores of foundrymen have reordered as many as three or four after a short trial of one.

Here's Why Kane & Roach Is Your Best Bet!

There's an excellent reason why Kane & Roach Straighteners are in such demand—that's because they're built to do a long-term heavy-duty job, and do it better, faster and cheaper. This claim is substantiated by foundrymen everywhere—who know and rely on Kane & Roach, the company that has specialized in designing and building high-quality straighteners for the steel industry since 1887. You owe it to yourself and to the industry to invest in a K&R machine for superior straightening of badly-needed core wire.

The NEW K & R CORE WIRE STRAIGHTENER

Works Better, Lasts Longer, because . . .

- 3 ADDITIONAL straightening rolls plus the pinch rolls, all of hardened steel.
- Roll gears are cut-steel, hardened.
- Drive gears run in oil.
- Maximum safety—guard encloses all moving parts.
- Pressure-release cam handles prevent jamming.
- Motor drive shielded from grit.
- Cabinet base encloses and protects sturdy, high-power motor.
- Extraordinarily long wear for all parts.
- Cut-off can be furnished for straightening and cutting new wire from the coil.

Cash in NOW! Send today for our new circular 58-B—the first step to savings.

KANE & ROACH, Inc., Syracuse, N. Y.
I want to know more about K&R new core wire straighteners. Send me Bulletin 58-B, without obligation. My sizes of wire are: .....
Company .....
Individual .....
Street .....
City and State .....

KANE & ROACH
SHONNARD AND NIAGARA STS.
SYRACUSE, N. Y., U.S.A.

"*Hand Tools* are taking a terrific beating in the war factories. WPB estimates that because of *improper use*, the life of 75% of such implements is being greatly reduced."
—NEWSWEEK

FACED WITH THIS *Problem?*

THIS *FREE* BOOKLET WILL HELP YOU

THE Cleco Cartoon Book presents, in a series of amusing cartoons, many useful hints for the proper care of pneumatic tools. It's full of practical do's and don't's telling how to get more work out of your tools, with minimum expense for repairs and compressed air. Your men will like the down-to-earth shop-talk used in this booklet. We have already had requests for thousands of copies. In the interest of efficient war production, write now for your free copy.

A TYPICAL **CLECO** CARTOON

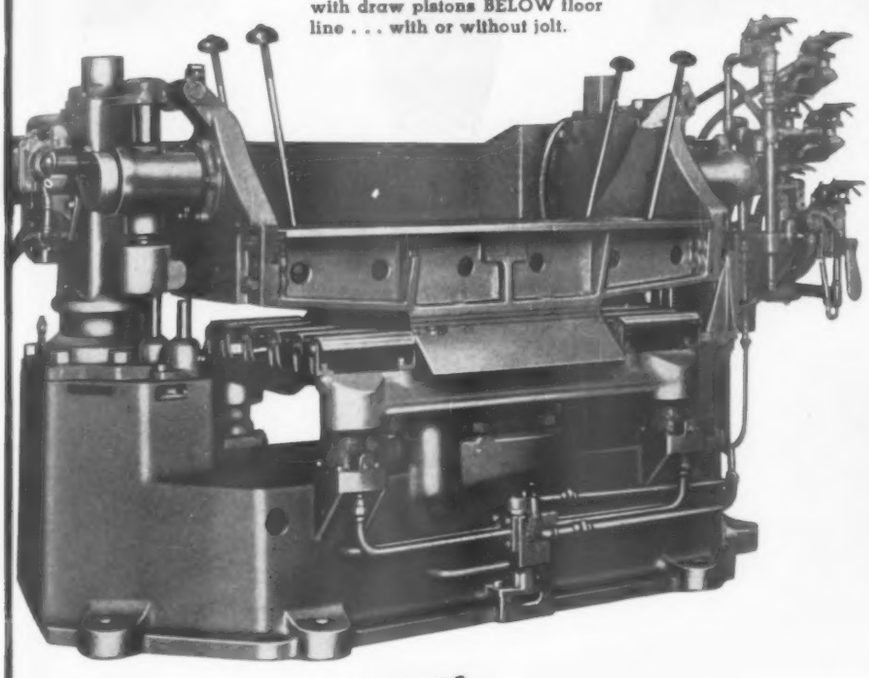
LUBRICATION—Proper lubrication is most important. Each morning, and at noontime, the operator should inject a few drops of Cleco "Never-Gum" oil, or other high-grade light machine oil, into the hose connection, unless an efficient air line lubricator is being used. Under conditions of continuous operation, the tool should have a few drops of oil every hour. Caution: If too much oil is used, or too heavy a grade, the tool will be sluggish.

THE CLEVELAND PNEUMATIC TOOL CO.
3781 East 77th St. *Branch Offices in All Principal Cities* Cleveland, Ohio
★

MILWAUKEE *High Speed* ROLLOVERS

Engineered for the VICTORY DRIVE

Models B & D
with draw pistons BELOW floor line . . . with or without jolt.

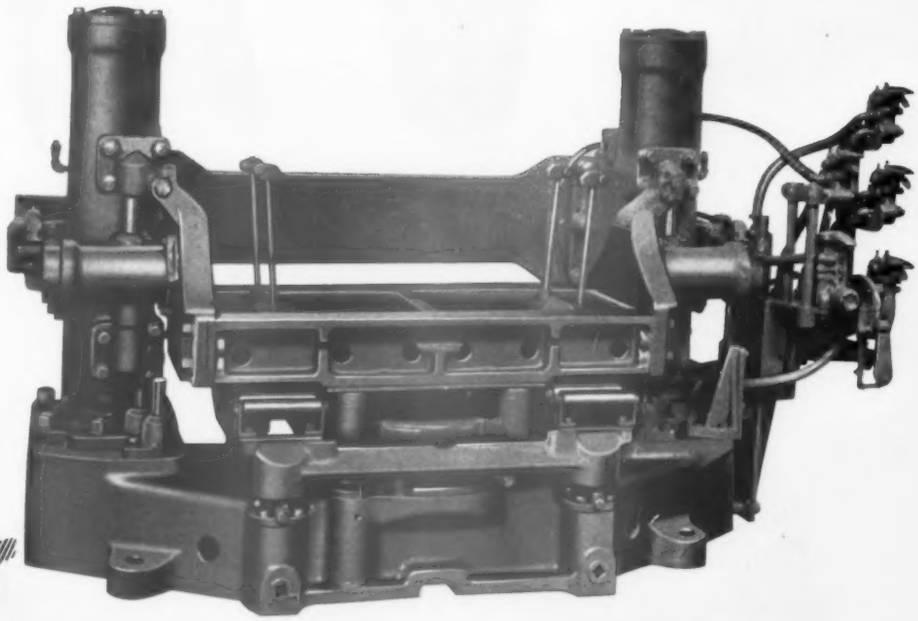


If you're really looking for PEAK production in your foundry, install one of these modern Milwaukee Jolt Rollover machines. It's designed by experienced foundrymen to meet today's vital need for greater war production. Ideal for both general molding and core making. Equipped with automatic air clamps, power rollover and instantaneous hydraulic leveling, it will solve your molding problems for the duration . . . and continue to serve you in the reconstruction period ahead.

Two models available, with draw piston ABOVE or BELOW floor line . . . with or without jolt. Write for further particulars.

Check THESE FEATURES

- ✓ Clamping is automatic.
- ✓ Rollover operation performed by simple, quick-acting pistons.
- ✓ Roll back cushioned by same pistons.
- ✓ Hydraulic leveling is instantaneous.
- ✓ Finished mold or core deposited on conveyor for ready removal.
- ✓ Absolute minimum number of parts results in lowest maintenance cost.
- ✓ Compact design — minimum floor space required.



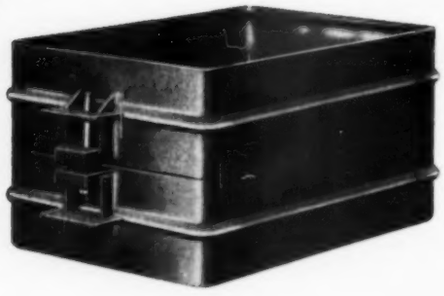
Models A & C
with draw pistons ABOVE floor line . . . with or without jolt.

MILWAUKEE FOUNDRY EQUIPMENT CO.

3238 WEST PIERCE STREET • Cable Address "MILMOLDCO" • MILWAUKEE, WISCONSIN

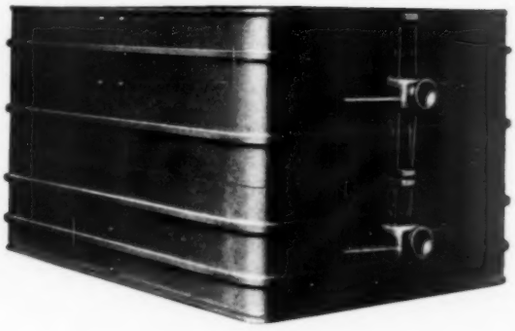
LOOK TO *Sterling* FOR YOUR FOUNDRY NEEDS

STERLING FOUNDRY FLASKS



Style "AA" Flask

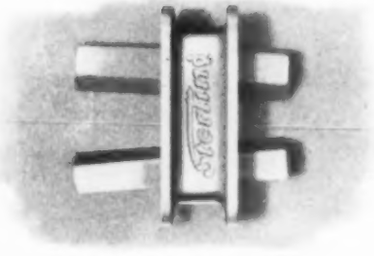
Style ⅜ NT-NNT Heavy Duty Flask



Style ¾ NT Heavy Duty Flask

Style "LL" Flask

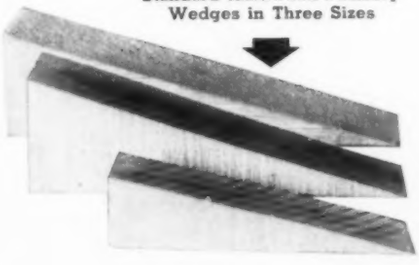
STERLING FOUNDRY ACCESSORIES



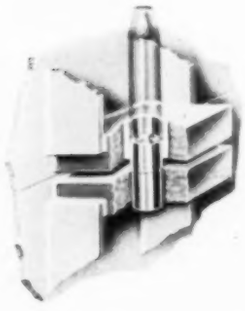
Sterling Standard Type "S" Flask Pin

Sterling Clamp in Position on Flask

Standard Hardwood Foundry Wedges in Three Sizes



Stub Pin in Drag Lug; Brushing in Cope Lug



Standard Hardened Steel Bushing Installed in Flask

Sterling Foundry Products include: All-welded Flasks in various styles and shapes — Flask Bars — Core Plates — Bottom Boards — Upsets — Skim Gates — Foundry Wheelbarrows, Carts and Trucks — Casting Carts — Charging Carts — Slag Buggies, etc. Consult STERLING for your foundry needs.

STERLING WHEELBARROW COMPANY • MILWAUKEE, WIS., U. S. A.

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To keep 'em Rolling

Keep Rolling 'em Out!

Now more than ever it is essential that you keep rolling molds off your mold lines at a speed that will enable critical materials to reach our fighting forces while they have the enemy on the run.

Herman molding equipment is designed to give you top production speed with maximum efficiency and minimum cost. Exclusive patented Herman roll-over arms save power, cut molding time. Gravity return of roll-over plate saves power. Pattern draw equalizer air-locks after adjusting itself to irregularities of flask. Rapid rotary valve control and automatic timing minimize personal attention. Mold deposited directly on roller conveyor.

We invite you to call on our experienced foundry engineers who will be glad to make suggestions for improving your molding lay-out without obligation.

MOLDING HERMAN MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

WASHED DRIED AND SCREENED SILICA SAND

Carefully Selected and Graded for Foundry Use—

FOUNDRY men throughout the country know the exceptional qualities of the uniformly screened grades of silica sand produced by the Ottawa Silica Company.

The grains being almost spherical, afford greater permeability and consequently finer sand can be used, effecting better finish.

Ottawa sands are durable! They do not break up! They are ideal for sand slinger work and are without equal for all foundry purposes where synthetic sands are employed.

FLINT
MOLDING AND CORE SAND
SILICA

A HARD, fast-cutting, thoroughly washed, dried Sandblast Sand, screened to uniform size, is produced by the Ottawa Silica Company and sold under the trade names FLINT SHOT and DIAMOND SANDBLAST SAND. It is the most economical agent that can be employed for all kinds of exacting sandblast cleaning. The round, pearl-like grains are hard as flint. They do not split up, but wear down uniformly and can be used over again many times. This abrasive flows freely, requiring less air power and gives the castings a smooth, silvery-like, velvety finish. Ask for our booklet, "Sandblasting Up To Date".

FLINT
IT PAYS TO USE
SHOT

DIAMOND
SAND BLAST

THE Ottawa Silica Company's three mills operate continuously the year round, making it possible to supply foundries with material promptly. Production includes a complete line of foundry sands suitable for molds, cores, furnace bottoms, sandblasting, for use generally in the steel, grey iron and non-ferrous fields—also Ground Silica (Silica Flour). The Ottawa Silica Company's engineering staff is always available for consultation and service on problems relative to the use of Ottawa Sands.

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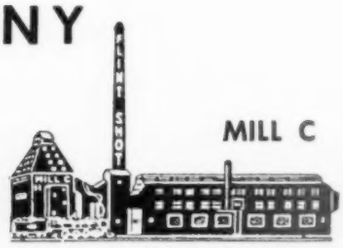
OTTAWA SILICA COMPANY

Ottawa, Illinois

MILL A

MILL B

MILL C



THREE PENNANTS FLY IN RECOGNITION OF

"High Achievement in the Production of War Equipment"

The employees of *all* Ingersoll-Rand plants won these Army-Navy "E" Awards for their high achievement in building equipment needed to win this war.

These men and women are turning out the Ingersoll-Rand machines urgently needed by our combat forces. They are also rushing through the I-R equipment that is vital for the production and operation of

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A TRIBUTE TO AMERICA'S FOUNDRYMEN

Out of the crucibles of AMERICA'S FOUNDRIES

flow the variety of metals upon which the war effort of the United Nations so vitally depends.

War production starts in the foundry... that's why the foundryman's job today is so utterly important. It is his duty to keep men and machines, in plants all over the nation, working at top speed to produce the finished weapons of war. And the foundryman is doing his job consistently, conscientiously and with keen intelligence.

We are justly proud of the part which DELTA Products for the Foundry play in SAVING TIME by SPEEDING PRODUCTION of FINER FINISHED CASTINGS. We are proud, too, of the wide acceptance of these products by the nation's leading foundries for it is evidence of the foundryman's readiness to employ proven developments of modern foundry research to maintain maximum production.

DELTA PRODUCTS FOR THE FOUNDRY

DELTA CORE & MOLD WASHES • DELTA GRAKOAT • DELTA NON-FERRUSKOAT • DELTA PARTEX (Nut Shell Parting) • DELTA SPRAY BINDERS • DELTA NO-VEIN COMPOUND • DELTA CORE OILS

Write for detailed information on any, or all, of Delta Products for the Foundry.

DELTA OIL PRODUCTS CO.

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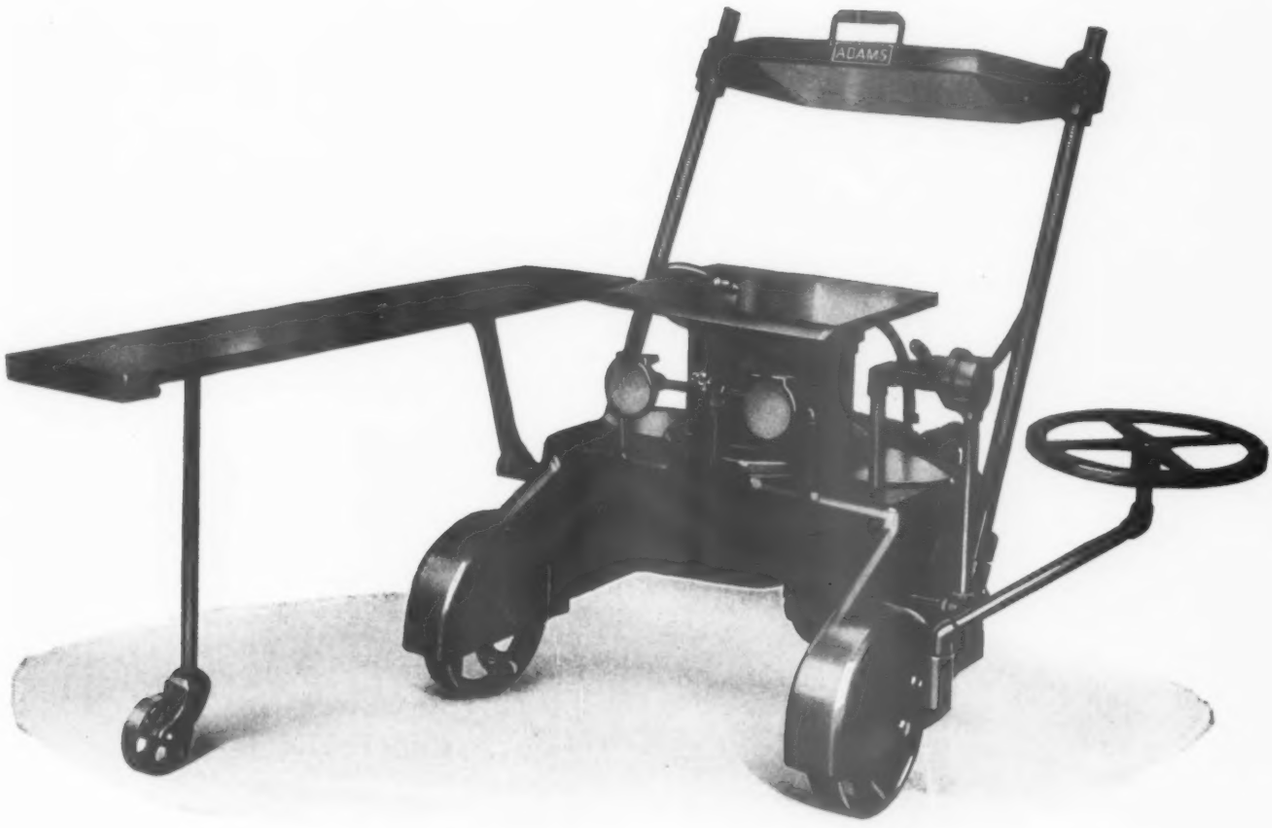

To Meet Production Schedules—
Use **Adams Jolt Squeezers**

They Will Reduce Production Costs. They are efficiently designed with a minimum number of working parts, and controls are accessible for quick handling.

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They Will Help to Maintain Uninterrupted Production. Simple design and durable construction provide insurance against production delays.

They Solve the Skilled Labor Shortage. Their operation has been so simplified that no special skill is required to operate them successfully.

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1883 — *Our 60th Year* — 1943

MOLDING MACHINES **ADAMS** **FLASK EQUIPMENT**

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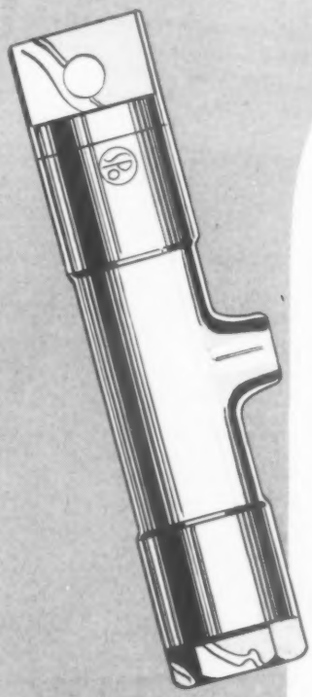
"NO MORE HOARDING OF *Undependable Vibrators* IN 1943 FOR ME!"



"Never again! It doesn't pay. Besides, we're much too busy.

"Molders have a big job to do. *Their time is valuable.* We want their production to stay 'tops', free from the annoyance of sticky vibrators. We want every molder to make out well and not to lose any molds through poor equipment.

"Experienced maintenance men are hard to find, and it takes a long time to train them. *Their time is valuable.* We don't like to put them on the thankless task of repairing old vibrators. They—and we—have far more significant work to handle."

Right you are, Mr. Foundryman. One new vibrator means a great deal more to your output than any number of undependable ones. Don't hoard broken-down vibrators. That's one good New Year's resolution. Keep it all through 1943 and every other year.

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WHEELABRATOR
FOR
DISTINGUISHED
SERVICE
Airless Blast Equipment

Still After

★8 YEARS

Not the oldest Wheelabrator Tumblast, but a real old timer is the 48" x 42" Wheelabrator Tumblast installed eight years ago at Clark Equipment Co., Buchanan, Michigan.

With years of gruelling service under its belt in cleaning steel castings this machine is still doing its part in the wartime production schedule.

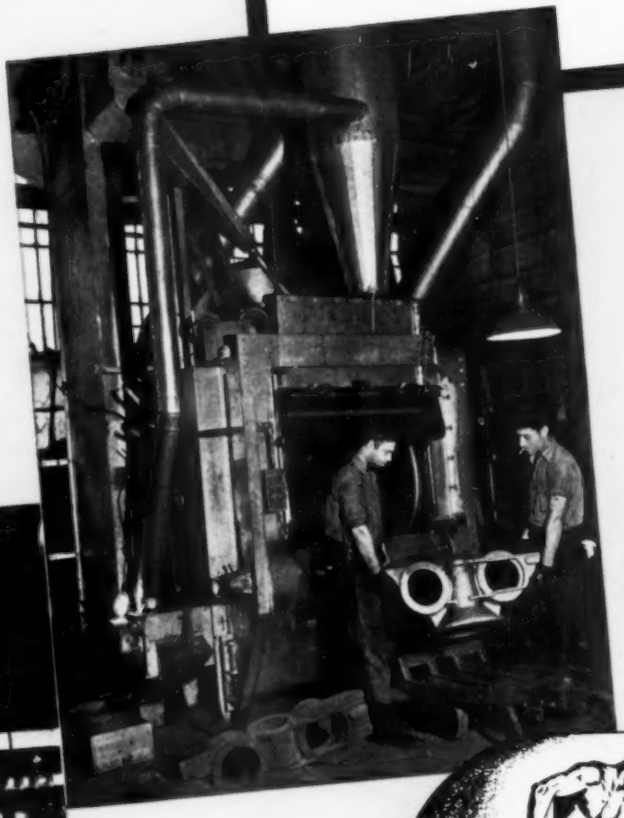
Only 6 minutes are required for cleaning castings in the rough and 12 minutes after annealing. Average tonnage handled in an eight-hour shift is 20,000 lbs.

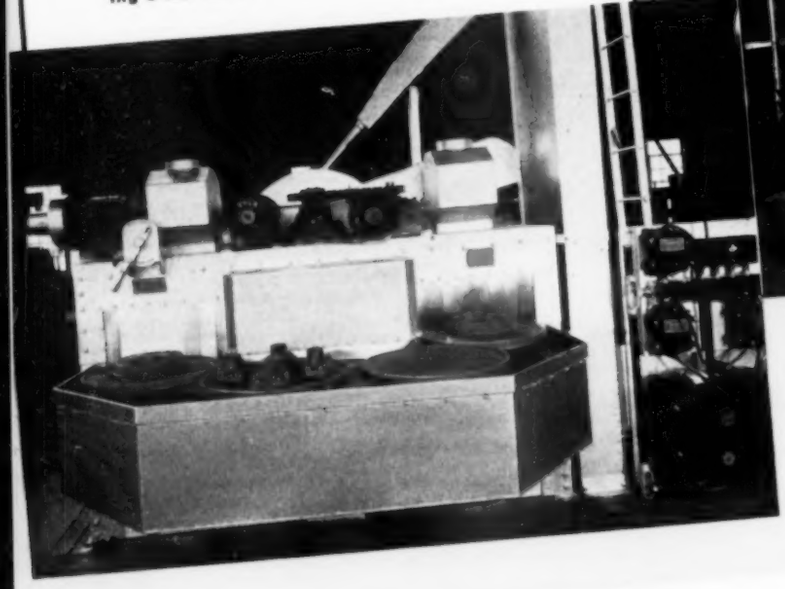
★7 YEARS

Another Wheelabrator with years of distinguished service is the No. 2 Wheelabrator Multi-Tablast installed at a large Eastern electrical company in August 1935.

Originally this machine was installed for cleaning meter parts and light steel motor stampings, but since the war began it is being used for removing heat-treat scale from magnet parts and miscellaneous motor castings.

In the course of a normal week this Wheelabrator machine cleans 15,000 small motor frames averaging 1½ lbs. each, and 1000 larger castings weighing 8 lbs. each.





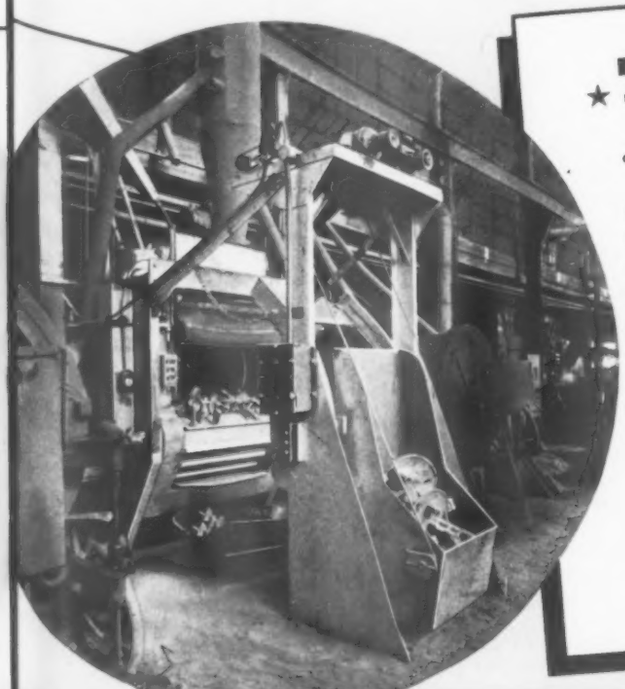
TRADE MARK
THE AMERICAN MOLDER
REG. U. S. PAT. OFF.

Performing Brilliantly Years of Gruelling Use!

A NEW broom usually sweeps clean, but only time will tell how long the pace can be maintained.

When the same analogy is applied to blast-cleaning equipment, consideration must be given not only to the effect of time, but also to the fact that such equipment is necessarily subjected to severe abrasive action and rigorous usage. For that reason it is extremely important, when buying equipment of this kind, to give special attention to design and construction features.

The best equipment is that which gives peak performance and dependable service over a long period of time. And that is exactly what you can expect from the Wheelabrator. Case histories of a few of the "old timers" are shown below—but if you want more, just say the word and we will see that you get them.



★7 YEARS

"Still operating around the clock, 24 hours a day".

Installed in March 1935 at Dodge Steel Co., Philadelphia, Pa., this 48" x 42" Wheelabrator Tumblast has been subjected to years of hard service in cleaning all kinds of steel castings.

Loads weighing over 1500 lbs. are cleaned in the rough with sprues and risers attached, in from 6 to 8 minutes, and after annealing in only 12 to 15 minutes. Individual steel castings weighing up to 100 pounds apiece are cleaned in the 48" x 42" Wheelabrator Tumblast.

★9 YEARS

Nine years ago a Special Wheelabrator Cabinet for cleaning centrifugally cast brake drums was installed at Centrifugal Fusing Co., Lansing, Michigan, replacing sand blast equipment.

Today this Cabinet is still in operation, and with the two additional Wheelabrator Cabinets more recently installed for the same purpose, is cleaning over five million drums annually. They say, "No other method could give us the production and quality which we must maintain."

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Blast Cleaning and Dust Control Engineers

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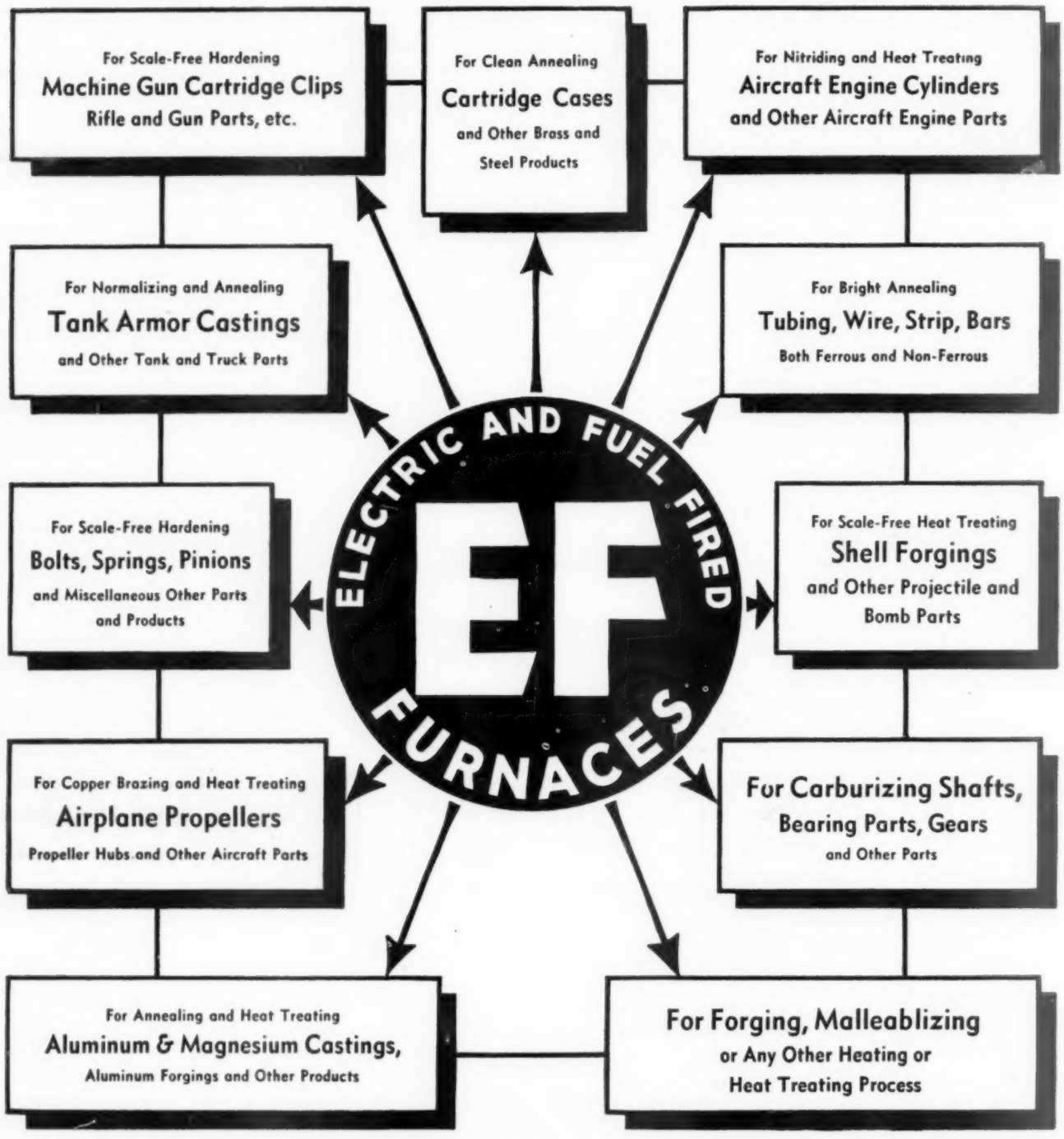

Increased production and uniformity; the saving of valuable time, labor and metals and other advantages have been effected by recent EF continuous automatic, semi-continuous and batch type furnace installations.

The Electric Furnace Co. specializes in designing and building production furnaces and time and labor saving material handling equipment. Years of practical furnace building experience have enabled EF engineers to develop some outstanding production furnaces for handling the above materials and many other essential war products.

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Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production

United Action Needed in Considering Problems of Foundry Industry

PROBLEMS facing the foundry industry appear to be growing much more complicated. After a year in which plant facilities have been constructed, expanded and converted to meet tremendous production demands from almost every phase of the war effort, manufacturers of castings still must find the answers to many questions. Decisions on these questions have a most important bearing upon the future service of the foundry industry to the war effort, and also upon the ability of producers of castings to meet successfully the highly competitive situations which surely will follow the war. An idea of some of the present problems may be gained by considering a few recent developments in several branches of the foundry industry.

Early in December reports were in circulation that WPB had stopped all work incidental to construction and equipment on a sizable number of steel foundry projects which originally were undertaken to produce tank castings. Some of these projects were well along toward completion. In at least one instance where announcement was made of the stop order, WPB attributed the drastic action to the policy of curtailing use of materials for construction projects, and to need for balancing all construction programs with production programs. This indicates that estimates on the need for steel foundry capacity were far in excess of actual requirements, due in part to the efficiency of those foundries already producing tank castings, and to the shifting of emphasis from tanks to aircraft as a factor of the new offensive war.

Of course the agencies at Washington could not anticipate accurately this shifting of emphasis, or may have expected that it would move in the direction of tanks. Nevertheless, the number and size of these projects which are believed to be involved in the curtailment order indicate a lack of co-ordination between actual war needs on the one hand and expansion programs on the other. Perhaps the war may yet produce a need for the partially completed facilities and they will be finished. But in the meantime they represent a waste of critical materials and man hours which are so badly needed in other directions.

In the gray iron branch, limitation orders curtailing production for civilian use, and inability to secure war work, have produced much idle capacity. Many light gray iron shops have closed down and it is believed that numerous others cannot continue long on the present available business. Although a vast amount of educational work has been undertaken by groups and individuals in the gray iron field, progress in selling the war agencies on the availability of gray cast iron for a wide variety of applications has not been sufficient to permit a number of good foundries to participate. In all probability, the difficulties in securing acceptance for war uses will be reflected in civilian market resistance after the war. The malleable branch has succeeded in making numerous substitutions, but here, as in the case of gray iron, considerable foundry capacity is available that should be used for war work.

A large expansion of facilities for the production of sand cast aluminum and magnesium is under way. While the 1943 plane program is tremendous, and the need for a large number of spare engines and engine parts may result from the present type of offensive action, this aluminum and magnesium foundry expansion seems enormous in the light of production records for light metal foundries in 1942. Can it be that this program, which now has the green light and high priority ratings, will be the target for future stop orders?

Today the war effort and the foundry industry suffer from lack of united action on foundry problems. Both government and industry are at fault. If the problem of castings procurement had been considered from the standpoint of the industry as a whole, and castings used on the basis of what was available to fit particular needs, deliveries would have been speeded, considerable expansion of facilities would not have been undertaken, and more foundrymen would be engaged in war work today. While much time has been wasted, the need for united action still is pressing.

Frank W. Stinchcomb
Editor

THE FOUNDRY
WHEREVER METALS ARE CAST

TRENCH MORTAR BOMBS Pass Critical

By PAT DWYER

Fig. 1—Getting ready to praise the Lord and pass the ammunition. Fig. 2—Small bull ladles resting temporarily on the points of a four arm revolving cross are filled in rotation from a bottom pour crane ladle. Fig. 3—Eight molds are made in a flask and poured in groups of four from a central sprue. Gates and risers are formed in the cope half of the mold. Sharp rods attached to the squeeze head vent the sand between and around the patterns. Fig. 4—Tight fitting prints hold the cores in place

Inspection

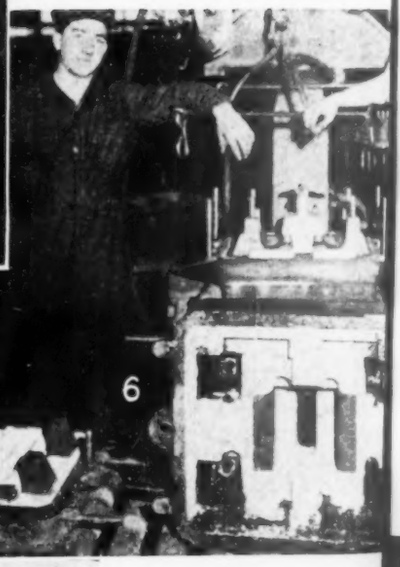
AN EXAMPLE of how the traditionally conservative foundry industry, drawn into the vortex formed by the roaring war machine, has adopted an accelerated tempo and developed methods of producing castings to meet specifications formerly considered outside the scope of practical accomplishment, is shown in a prominent Canadian steel foundry. Erected and equipped first for the production of aerial bombs as described in the December, 1941 issue of THE FOUNDRY, the plant has since been enlarged and extended for the production of trench mortar bombs and tank tread shoes.

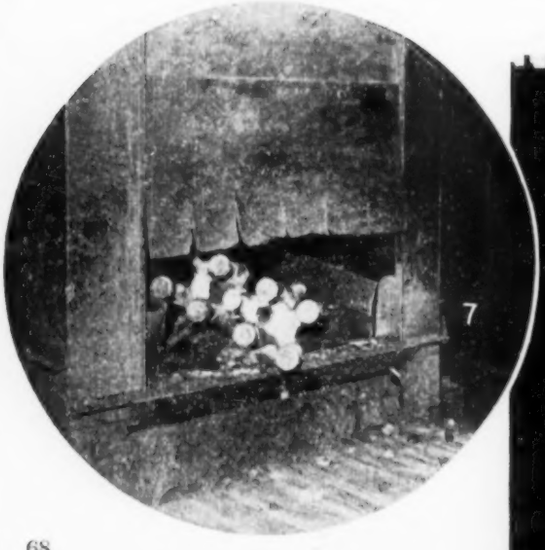
Production of the large bombs was continued in the original part of the foundry while the parallel part of the foundry was under construction and until the new units, molding, coremaking, pouring, shakeout and sand handling were functioning at capacity in a satisfactory manner. Then a considerable part of the equipment in the heavy bomb section was dismantled, removed and replaced by equipment similar to that in the newer section. At the time these notes were taken the transfer was in progress and probably will be completed before this reference appears in print. The melting department, with two 3-ton and one 6-ton electric furnaces remains in the original location at the east end of the foundry. Part of the extension on this end of the building provided for the installation of a fourth furnace.

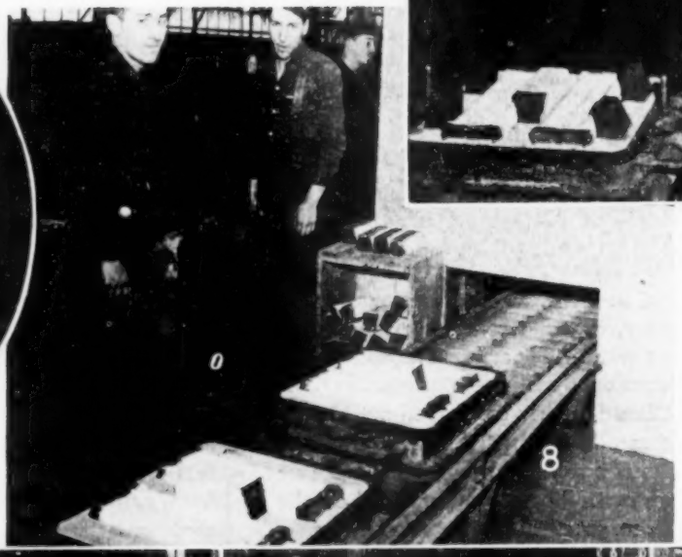
The trench mortar bomb is a steel casting 9⅝ inches in length, 3 inches diameter, open at one end, and machined at both ends. Castings a few grams overweight may be salvaged by grinding, but otherwise perfect castings a gram or two under weight are rejected by a corps of lynx eyed inspectors representing the government. To the ordinary layman the problem of maintaining absolutely uniform weight in thousands of castings presents no difficulty. Experienced foundrymen know that castings made in green sand molds will vary to some slight extent depending on the condition of the sand. More moisture evaporates when the air is warm and dry, than on days when the humidity is high. The molding machines are set to ram the sand to a definite density under average sand conditions. Static pressure of the metal will increase the volume of a casting to some slight extent in a mold where the moisture content is low. Microscopic tolerances in measurement and weight to which these castings must conform are illustrated by a typical instance in which the castings from one set of patterns consistently were under weight. The patterns were brought up to full and robust proportions by dipping them in an electro plating bath which deposited metal over the surface to the approximate thickness of a sheet of paper. However, that was an emergency measure and is referred to merely to show that modern foundry practice has jumped a long way since a 10 per cent variation in weight was accepted cheerfully as a natural phenomenon by foundrymen and customer.

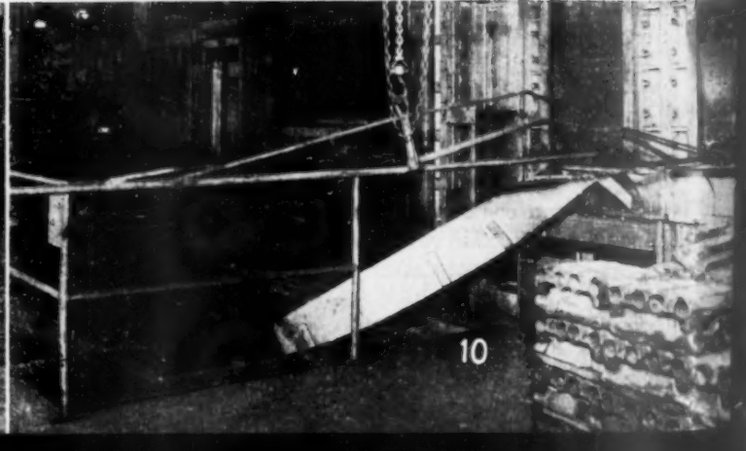
When patterns through continued use are reduced slightly in size with consequent reduction in the size and weight of the casting, they are discarded and replaced by new patterns. A different procedure is followed with the coreboxes which are subjected to more severe service than the patterns. The coreboxes are lined with pieces of thin sheet copper, cunningly fitted and riveted in place. When this copper lining shows signs of wear it is removed and replaced with a new lining. Original pattern

Fig. 5—Flasks are handled with a special bail. Fig. 6—Tank shoes are molded two in a flask. Fig. 7—Shakeout separates sand and castings. Fig. 8—Riser in center also serves as sprue. Fig. 9—A dry sand pouring cup is placed on top of each tank shoe mold. Fig. 10—From the heating furnace the casting slide through a chute into the quenching tank. Fig. 11—Castings are cooled before the gates are knocked off









and corebox equipment for the foundry was supplied by an outside interest, but maintenance, repairs, changes in certain features are carried on in a well equipped pattern shop near the west end of the foundry building.

The item of proper gates and risers and experimental work in connection with this phase of foundry practices has received particular attention. The main object, as in all steel casting practice is to provide gates and risers to insure solid, homogeneous castings. The second object is to reduce the amount of metal to the lowest point consistent with safety. In the present instance the weight of good shell castings amounts to 52 per cent and shoes 65 per cent of the weight of metal poured in the molds. This is not as high as the record of 80 per cent achieved on the large aerial bomb castings, but compares favorably with contemporary steel foundry practice on light weight castings.

A brief survey of the production department of the foundry shows the coremaking department at the east end close to the station where the molds are made on four jolt squeeze machines, two machines to a unit, one for the cope and one for the drag. The center space in this bay is occupied by roller conveyor lines on which the molds are placed and on which they remain until they are shaken out at the far end, and one double conveyor line in the center on which the empty flasks are returned to the two molding stations.

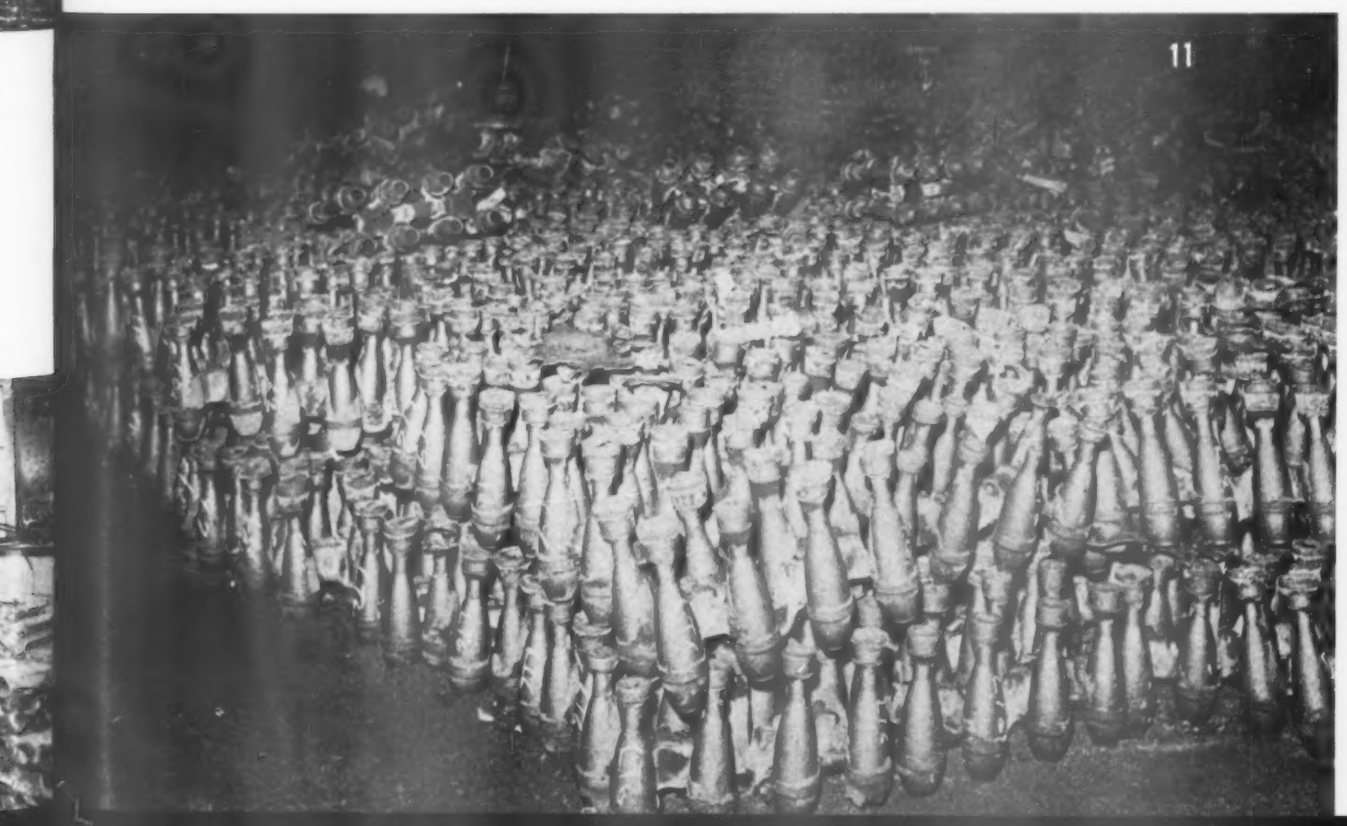
The sand conditioning unit is located close to the shakeout station. Sand falls through a grating in the floor and on to a belt which feeds a bucket elevator. It passes through a revolving screen into a large storage bin and then in measured batches with necessary additions of water and binding material passes through a muller type mixer and is discharged at floor level on a long inclined belt. At the point where the belt reaches the highest elevation the sand falls into a storage hopper which feeds transverse belts extending over the open tops of the individual hoppers which supply sand to the molding machines.

Incidentally all new sand is imported from the United States. It is claimed that up to the present no grade of silica sand suitable for steel foundry use has been discovered in Canada. Possibly in the vast and varied natural resources of the Dominion suitable deposits are in existence, but they either are unknown, or located in places without adequate or any transportation facilities. A glance at any Canadian map will show a great territory still awaiting the investigator and explorers.

Molding sand is used continuously, but the cores are made exclusively of new sand bonded with oil and a small amount of cereal binder. The cores are made on a core blowing machine and baked in dryer shells. The corebox split on a longitudinal center line and with two core cavities is placed on the table of the core blowing machine and packed full of sand. The operator lifts the box from the machine and places it in a device where a pneumatically operated plunger forces a ¼-inch pointed rod longitudinally through the center of each core to form a vent opening. The venting device built in the maintenance shop is one of many ingenious shop kinks and gadgets installed here and there from time to time to facilitate production.

In this instance the idea was suggested by the small pneumatic cylinder, part of the standard equipment, used in operating the doors on the sand chutes. A similar cylinder mounted horizontally on a frame had a cross bar attached to the outer end of the piston rod. Vent rods were attached to the cross bar at distances to correspond with the distance between the centers of the two core ends. When air is admitted to one end of the cylinder the piston rod is pushed forward and the vent rods pierce the cores to a point within ½-inch of the pointed end. When air is admitted to the other port in the cylinder, the rods are withdrawn instantly. Distance the rods travel automatically is controlled by the position of the cylinder ports.

Since the cores are supported in dryer shells while in the green state, and later are placed in the molds in a vertical position, no rod, wire or other form of reinforcement is necessary. After the (*Please turn to page* 151)



Foundries MAKE MAJOR

In what ways have war demands for castings influenced the foundry industry? To obtain an answer to that question, the editors of STEEL requested comments from a number of foundrymen in the various branches of the industry for publication in the Jan. 4, 1943 Yearbook of Industry issue. Because these comments are indicative of past performance and possible future trends, they are reproduced in this issue through the kind co-operation of the editors of that publication.

Gray Iron Castings' Quality Maintained Despite Lack of Suitable Raw Materials

By HENRY S. WASHBURN
Plainville Casting Co.
Plainville, Conn.

MUCH of the development work in our gray iron foundries today cannot be discussed at the present time for obvious reasons, but one job is being accomplished which deserves comment.

During the past very few years, the gray iron foundry industry has made notable advances in the production of high tensile irons and special mixtures for castings tested under high pressure. During that period the manufacturers of the materials we use have made possible our development work by giving us continually better grades of material.

Today, with decidedly inferior quality in some of our materials and with the necessity for entirely eliminating the use of some alloys and the necessity of finding substitute methods, we are maintaining the quality of our product and are able to continue to meet the rigid specifications demanded in war production.

Our industry accepted the challenge and the results speak for themselves.

New Principle in Heading and Gating of Steel Castings Save Much Metal

By W. H. WORRILOW
Lebanon Steel Foundry Co.
Lebanon, Pa.

A FEW years ago there was developed under the direction of one of our present employes, what is today known as the "principle of atmospheric pressure in feeding steel castings." This was an entirely new principle, applied to the heading and gating of steel castings and resulted in a marked saving of metal, which, of course, went into producing castings instead of into heads and gates.

This principle is being applied to practically all the castings manufactured at Lebanon, from the simplest valve casting to the most intricate tank armor or turbine casting, and increase of yield of good castings to melt shows a marked increase in all castings. The percentage of increase depending upon the design.

The intensive use of this principle plus the full and proper use of the principles of directional solidification, to my mind, mark two of the largest achievements in the steel casting industry that have taken place since the industry began, and the refinement and complete use of them has been one of the outstanding achievements at Lebanon this year.

A thorough study of these two developments would prove of great value to the industry, as the use of them is an effective way of saving metal, as well as labor in molding and cleaning.

Enormous Interest Shown in Effect of Small Additions of Unusual Alloys

By HARRY A. SCHWARTZ
National Malleable & Steel Castings Co.
Cleveland

TWO things seem outstanding in my own contacts with foundry practice. First is the increased interest in "pearlitic" malleable iron, displayed by various governmental agencies. This may well lead to introduction of that material into civilian uses after the war for purposes not heretofore contemplated. Secondly, the effect which the growing scarcity of the alloying elements has in making it more and more necessary to rely upon plain carbon steels or very nearly plain carbon steels. This has promoted an enormous interest in the effect of very small amounts of unusual alloys, especially from the viewpoint

CONTRIBUTIONS TO *War Production*

of hardenability. It has also concentrated attention upon improved steel making practice. Possibly a third item is a trend, deserving much commendation, toward judging of the suitability of a given metal for the intended use by service or proof tests rather than by conformity to some particular mechanical properties which have been deemed, often on insufficient grounds, necessary for the intended purpose.

War Effort Impact on Bronze Foundries Brings Forth Numerous Problems

By HAROLD J. ROAST
Canadian Bronze Co. Ltd.
Montreal, Canada

WITH the ever increasing demand of the war effort on the bronze foundries and bronze castings come many problems. I am impressed with the increasing need of making castings "honestly good all the way through." This is necessary if we are to leave welding and forging operations free to do other war work that cannot be covered by the casting industry. A great deal of the hesitancy of the engineer to use castings instead of welded or forged structures is due to the internal defects of castings which are caused by lack of proper manufacture in the first place and proper inspection in the second.

In this connection, I feel there is a growing demand for centrifugally cast castings, both those cast in chill molds and those in dry sand molds. Then again, there is an increasing need for castings made in chill molds even without the centrifugal operation. For example, pressure disks that are required to be entirely free from internal intercrystalline shrinkage.

Now that tolerances of machined castings are required to within 1/1000-inch on diameters as high as 4 inches, we find changes in measurement occurring after machining. This emphasizes the need of heat treatment of bronze castings before machining and in some cases even after rough machining. (*Please turn to page* 153)

metal and

METAL COST

FROM Inventory

CAR NO. NYC 164786 GRADE A

ANALYSIS

	%
	%
	%
	%
	%
	%
	%
	%

	POUNDS	COST		PRICE	DATE	REC'D
	36000	$392	30	.0109	9/1-42	USED
	11510	125	36			BAL.
	24490	266	94	.0109	9/8-42	USED
						BAL.
						USED
						BAL.
						USED
						BAL.
						USED
						BAL.
						USED
						BAL.

INVOICE NO.	1275	1285	
	METAL	FREIGHT	UNLOAD
COST	$360 00	$28 80	$3 50

FIG.1

LEDGER

ACCOUNT No. 1 NAME Purchased Metals

DATE	EXPLANATION	SOURCE	DEBITS	CREDITS	BALANCE
					$45 16 $10
9/1-42	Inventory Start of System	FIG.1			
9/30-42	Purchases for the Month	FIG.4	20942 58		
9/30-42	Used in September	FIG.8		39006 00	27 100 68

FIG.2

METAL COST

FROM The Pig Iron Co.

CAR NO. PRR. 164861 GRADE B

ANALYSIS

	%
	%
	%
	%
	%
	%
	%
	%

	POUNDS	COST		PRICE	DATE	REC'D
	92,960	$871	31	.0094	9/20-42	USED
	8046	73	62			BAL.
	84914	798	19	.0094	9/25-42	USED
						BAL.
						USED
						BAL.
						USED
						BAL.
						USED
						BAL.
						USED
						BAL.
						USED
						BAL.

INVOICE NO.	1406	1415	
	METAL	FREIGHT	UNLOAD
COST	$799 21	$62 60	$10 00

FIG.3

CUSTOMER	DATE → 9/5/42	
PATTERN NO.	PIECES → 1010	
	TOTAL COST	COST PER 100 #
MELTING-Weight in Mold 1231 # @ .28	$3.45	35
CORES 1000 top Time 5.0 Labor →	3.00	31
1000 bottom " 8.0 "	4.80	48
" "		
" "		
overhead- " 13.0 @ 90 #	11.70	1 14
HRS. Total	19.50	1 93
MOLDS-Molders Time 16.0 @ 85 # Labor →	13.60	1 34
Helpers " 16.0 @ 50 # "	8.00	78
Overhead " 32.0 @ 83 #	26.56	2 61
Total	$48.16	4 73
CLEAN Barrel 1010 # @ 38 # / 100 #	3.84	38
Grind Time 11.0 hrs. @ 50 #	5.50	54
Chip "		
Brush "		
Table S.B. "		
Overhead " 11.0 @ 40 #	$4.40	43
TOTAL	$9.90	97
TOTAL OPERATING COST	$81.01	7 98
SCRAP LOSS	1.26	12
CONVERSION COST	$82.27	8 10
PROFIT @ 20% on conversion cost		1 62
OTHER OPERATIONS		
Pattern Work 1½ hrs @ $2.00	3.00	29
METAL-Melted Mixture #101-123 # @ .0112	$13.78	
-Returned 12 148 @ .0080	1.18	
-Loss 6% 73		
Good Cast 82% 1010 #	12.60	1 24
SELLING PRICE per 100 #	$11	25

FIG.5

METAL PURCHASES 1942

NORMAL MONTH	$20000	- $1500	- $250	- $21750 --

METAL PURCHASES

Month of September 1942

DAY	SOURCE INVOICE	FREIGHT	UNLOAD	CHARGE
1	$1610 18	$110 10	$25 60	$1745 88
2				
3				
4				
5				
6				
7				
8				
9				
30				
31				
TOTAL MONTH	$19200 16	$1502 40	$240 02	$20942 58
OCT.	$172810 60	$13518 06	$1960 10	$188288 76
NOV.	$			
DEC.	$			
TOTAL 1942	$250400 11	$18240 75	$2483 39	$251523 78

FIG.4

MELTING DEPARTMENT LABOR

DATE September 4, 1942

UNLOAD	KIND OF MATERIAL	PIG		SCRAP		COKE		SAND		BRICK		MAINTENANCE AND REPAIR		OTHER DEPARTMENT LABOR	
	CAR NUMBER	PA 164810		NYC 7482		L+N 11016		PA 154817		C+O 87645					
	EMPLOYE	TIME	WAGES	TIME	WAGES	TIME	WAGES	TIME	WAGES	TIME	WAGES	TIME	WAGES	TIME	WAGES
118	Jeppe	8 0	5 60												
148	Komarski											6½	4 55	1½	1 05
164	Fanner					4 0	2 80	2 0	1 40			½	35	1½	1 05
46	Finico													8 0	6 40
218	Leonard									5 0	3 50	3 0	2 10		
68	Brown													8 0	5 60
72	Washeleski							6½	5 20					1½	1 20
96	Jameson			6½	4 55									1½	1 05
72	Floreski													8 0	6 00
15	Yanke					4 0	2 80							4 0	2 80
16	Miller													1½	1 50
10	Johnson													1½	1 35
2	Bennet													1½	1 35
	James													1½	1 65
	Smith													1½	1 35
	Reynolds													1½	1 50
	Kosch													1½	1 50
	Brewster													1½	1 50
	Olson													1½	1 65
	Myers													1½	1 35
	Bozier	6½	4 60												
	TOTAL	14½	10 20	6½	4 55	8 0	5 60	8½	6 60	5 0	3 50	10 0	7 00	49 0	34 85

FIG.6

melting cost
In a Gray Iron Foundry

By Albert E. Grover
Cost Consultant
Berea, O.

FUNCTION of the melting department in a gray iron jobbing foundry is production of melted iron required for the many different sizes, shapes and compositions of castings for uses of customers. The performance of this function consists of: A—Metal; B—Melting.

Dependable metal costs of separate castings are predicated on the measurements of: Materials used in the mixture and the ratio of each to the total; yield, or percentage of good castings to total iron melted for each casting; variations in costs of metals and other materials.

Establishing Inventory (Pig Iron): A *Metal Cost* card, Fig. 1, is prepared for each separate car, or part of a car, actually on hand. Each car of metal having been piled by itself when unloaded and identified by the number of the car used for shipment by a tag painted on one of the pigs or preferably painted on a board placed on the pile of pig iron.

1. The number of pigs in the pile are counted.

2. Ten pigs are weighed to determine the average weight per pig.

3. The number of pigs in the pile is multiplied by the average weight per pig and the resultant figure (36,000 pounds) entered on the metal cost card, Fig. 1. Entering also the date (9/1/42); the car number (NYC 164786) and the grade of iron (A).

4. Referring to the purchase invoice for this particular car of pig iron the purchase price per pound is calculated. The pounds of inventory (36,000) is then multiplied by this price per pound, and the result of this computation ($360) also the purchase invoice number (1275), entered as *Metal* on the bottom of the metal cost record card.

5. Referring to the freight bill for this particular car of pig iron the cost of freight per pound is calculated. The pounds of inventory (36,000) is then multiplied by this price per pound and the result of this computation ($28.80). Also the invoice number of the freight bill (1285) is entered as *Freight* on the metal cost record.

6. A record of the labor cost to unload each car of pig iron is kept. The cost to unload this car is divided by the pounds in the car, when unloaded, resulting in the cost per pound to unload. The pounds of pig iron on hand (36,000) is multiplied by this cost per pound to unload and the result of this computation ($3.50) entered

Fig. 1—Inventory metal cost card. Fig. 2—Ledger sheet for purchased metals. Fig. 3—Purchase metal cost card. Fig. 4—Metal purchases. Fig. 5—Casting cost calculations. Fig. 6—Melting department labor costs. Fig. 7—Metal used card. Fig. 8—Home scrap ledger account

FIG. 7

METALS USED

MIXTURE NO. (A) CHARGING DATE (D)

PIG IRON ANALYSIS	GRADE	GRADE
	%	%
	%	%
	(B) %	(B) %
	%	%
	%	%
	%	%
	CAR NO. (E)	CAR NO. (E)
WEIGHT ONE CHARGE	(a)	(a)
TOTAL WEIGHT		

TALLY

5	10	15	20	25	30	35
/////	///					

REMARKS

ALLOY	SCRAP PURCHASED	SCRAP HOME	COKE	FLUX
(b)	(c)	(d)	(e)	(f)

FIG. 8

ACCOUNT NO. 2 NAME Home Scrap

DATE	EXPLANATION	SOURCE	DEBITS	CREDITS	BALANCE
9/1/42	Inventory start of system				$ 500 00
9/30/42	Used in September		$ 588 77	$ 368 00	
9/30/42	Produced in September				720 77

as *Unload* on the metal cost record as shown in Fig. 1.

7. The total cost of metal is: Metal $360.00; Freight 28.80; Unload 3.50 or a Total of $392.30 which is entered as *Cost* at the top of metal cost card. This total cost of metal is divided by the pounds of iron inventoried (36,000) resulting in the price per pound ($0.0109).

The *Analysis* section of the metal cost card is used only when desired. Inventory quantities and costs for scrap iron and alloys are determined in this manner using the same forms.

When the quantities and costs of all metals on hand have been recorded on the metal cost cards, the cost amounts shown thereon are added and the sum obtained entered as *Balance* on the *Ledger* sheet for purchased metals, Fig. 2.

Purchasing: A *Metal Cost* card is prepared for each receipt of metal, Fig. 3

1. Entries to this cost card as shown for metal received are made from the purchase invoice and include: From The Pig Iron Co.; Car No. PRR 164861; Grade B; Invoice No. 1406; Metal Cost $799.21; Pounds Received 92,960.

2. Entries to this cost card for freight paid are made from the freight bill and comprise: Invoice No. 1415; Freight Cost $62.60.

3. Entry to this cost card for unloading is made from the record of labor cost ($10.00) for unloading this car (see *Melting Department Labor* record Fig. 6).

4. The total cost of metal is: Metal $799.21; Freight $62.60; Unload $10.00 or a Total of $871.81 which is entered as *Cost* to the metal cost card. This total cost of metal is divided by the pounds of iron received (92,960 pounds) resulting in the price per pound, $0.0094).

5. Each day the sum of the metal, freight, unload and total cost amounts shown on the metal cost card or cards is entered on the *Metal Purchases* sheet, Fig. 4. The amounts entered hereon as of Sept. 1, 1942 represents the sum of entries to two metal cost cards.

Table I

Metal Cost By Classes

Metal Melted	—Mixture No. 1— %	Pounds	—Mixture No. 2— %	Pounds
Pig iron, Grade A	44	41,061		
Pig iron, Grade B	31	28,930	40	42,671
Alloy	2	1,866		
Scrap, Purchased	8	7,466	30	32,003
Scrap, Home	15	13,999	30	32,004
Total melted	100	93,322	100	106,678
Produced				
Good Castings	40	37,329	74	78,941
Home Scrap	56	52,260	20	21,336
Melting Loss	4	3,733	6	6,401
Total	100	93,322	100	106,678

Cash	Total	Per Pound	Total	Per Pound
Fig iron, Grade A	$ 448.	0.0109		
Pig iron, Grade B	372.	0.0094	$401.	0.0094
Alloy	73.	0.0400		
Scrap Purchased	37.	0.0050	160.	0.0050
Scrap, Home	112.	0.0080	256.	0.0080
Total Metal Cost	$1044.	0.0112	$817.	0.0077
Melting Loss	$ 42.	0.0112	$51.	0.0077

Table II

Schedule for Melted Metal Cost

Investment	Value	Life Yrs.	Depreciation
Land	$1,250		
Buildings	2,460	30	$82
Freight Elevator	2,382	25	95
Cupola	1,720	20	86
Ladles	734	10	73
Charging Cars and Track	600	15	40
Trolleys and Track for pouring	475	15	32
Blower	1,528	15	102
Motor	368	10	37
Power Feed Wire	350	10	35
Misc. Tools and Equipment	465	10	47
Inventory			
Pig Iron	3,210		
Scrap Iron	260		
Coke	350		
Repair and Supply	310		
Total Investment	$16,462		
Overhead			
Depreciation			$629
Property Taxes			85
Property Insurance			32
Interest on Investment @ 5%			823
Investment costs—One year			$1569
Investment costs—one month			$131
Power			60
Repairs			122
Supplies			482
Supervision			150
Clerical			40
Labor			320
Emplove taxes and insurance			27
Miscellaneous expenses			76
Total overhead or operating cost			$1408
Iron melted 500,000 pounds—cost per 100 pounds; cents			28

Make Entries for Each Day

The monthly metal purchases sheets are provided with lines to accommodate entries for each day of the month and a total line at the bottom of the sheet for recording the sums of all entries made during that period.

These sheets are superimposed on a master sheet, in a multiple ring book, so that the totals of the several months' entries are visible and permits comparisons by months, as well as with the established normal, shown at the top of the master sheet *Normal Month*.

Another feature of this arrangement is the provision for showing the accumulated totals at the close of each month, as illustrated by amounts shown opposite *Oct.* on the master sheet.

At the close of each month's entries, the several columns are added and the totals entered on the bottom line of the sheet *Total Month*. The total of the *Charge* column being posted to the debit of *Metals Account No.* 1, Fig. 2. Credits being made to: Accounts Payable for the invoice total; Transportation for the freight total; Pay Roll for the unloading total.

All metal cost record cards, both for inventory and purchases, are filed pending credits for metals used.

Used: A supply of *Metals Used* cards, Fig. 7, are prepared for each separate kind of mixture showing: (A) Mixture number; (B) analysis of each kind of pig iron; (C) weight of one charge, (a) pig iron (each kind), (b) alloy, (c) scrap (purchased), (d) scrap (home), (e) coke, (f) flux. This form is full size. These cards are used to tally the number of heats for a day (D) using a separate card for each separate mixture.

Each charge is recorded by making a straight perpendicular line in the *Tally* section of the card. The illustrated recording shows eight charges (*Please turn to page* 159)

Investigate

Cast Iron in Elevated Temperature Operation

IN ACCORDANCE with the established policy of relieving already overburdened industries by encouraging the use of more readily available substitute materials whenever possible, the War Production Board has approved a field research project to study the possibility of utilizing cast iron in operations at elevated temperatures. This program is being conducted by the War Metallurgy Committee, National Academy of Science, Washington, with the co-operation of the American Foundrymen's Association. T. E. Barlow, Vanadium Corp. of America, and C. O. Burgess, Union Carbide and Carbon Research Laboratories, have been appointed to obtain the desired data.

A number of prominent foundrymen have expressed the opinion that cast iron could be utilized, at least as an emergency measure, in a number of vital applications at temperatures in excess of the usually accepted limit of 450 degrees Fahr. If this opinion can be substantiated by commercial evidence, the cast iron industry is in an excellent position to relieve the present strain on the steel foundry capacity, to a considerable degree. At the same time, the general acceptance of cast iron in certain applications at temperatures of 600 degrees Fahr., 700 degrees Fahr., 800 degrees Fahr. or even higher, would permit of more economical utilization of some of the idle cast iron foundry capacity and increase the rate of war material production. All of these conjectures, however, require some definite proof that the substitution can be made safely and economically, as either a permanent change or as an expediency of the war.

A brief analysis indicates that in many applications cast iron apparently is being utilized at temperatures in excess of 450 degrees Fahr. with complete success. In other industries, of an apparently similar nature, its use is restricted by written or unwritten codes. These restrictions in many cases date back more than 20 years and are based on observations made at that time. The possibility that the quality of cast iron has improved sufficiently during the past 20 years to make such restrictions obsolete, is at least worth investigating.

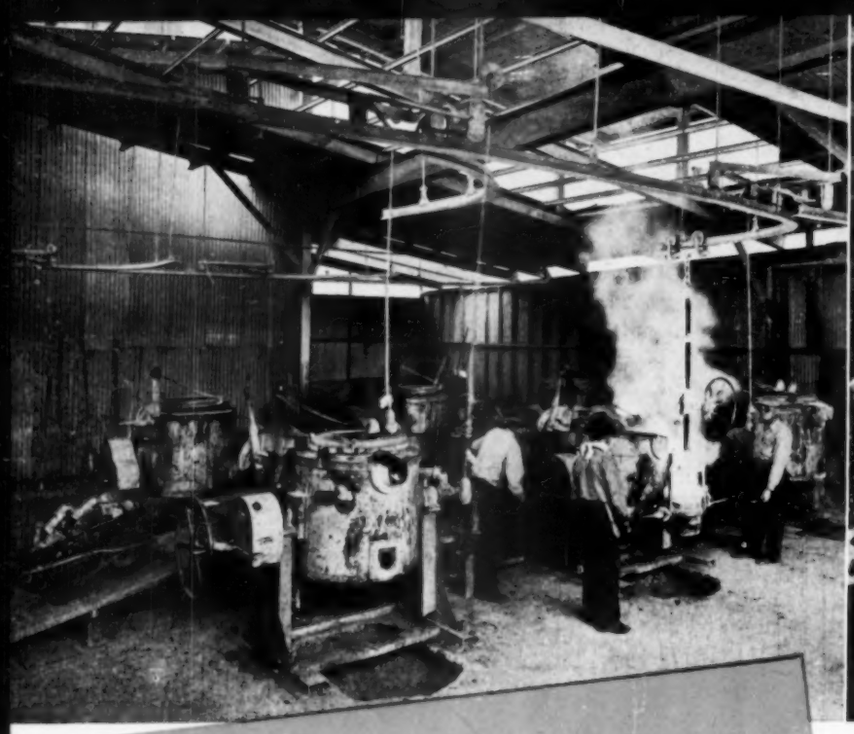
Inasmuch as actual service records are the final criterion in recommending a substitution of one material for another, the object of this study will be to determine when, where and how cast iron is being or has been used in applications in excess of 450 degrees Fahr. Knowledge of the failure or success of such installations together with the accompanying circumstances is essential before conclusive recommendations can be made. It also is necessary to determine whether any failures which may have occurred were due to the inherent properties of cast iron itself or to the character of an individual iron casting.

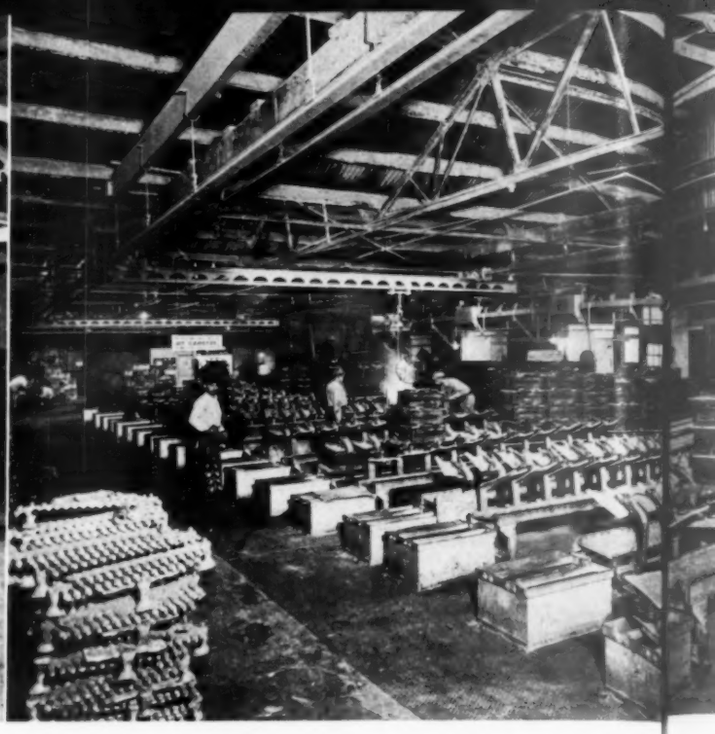
The extreme breadth of this research project and the limited time available make it imperative that the two men appointed for the work obtain the complete co-operation of the industries involved. The more rapidly the required information is obtained and correlated, the sooner will the results be available to the war effort. Therefore, these men have requested that engineers, foundrymen, field service men and others possessing information regarding present or past installations, successful or otherwise, of cast iron subjected to temperatures in excess of 450 degrees Fahr., contact them as soon as possible, including all available information and suggestions as to where and how more detailed information can be obtained. Such suggestions will be followed as quickly and as thoroughly as possible. The information desired should cover as many of the following points as are known to the individual furnishing these data:

1. Name of user or source of more detailed information
2. Type of equipment, such as valves, pumps, engines
3. Approximate weight and section of casting
4. Temperature casting is subjected to (over 450 degrees Fahr.)
5. Type of heating, such as steam, flue gas, direct fired etc.
6. Amount of pressure, if any
7. Cause of failures, if any
8. Factors of service involved, wear, pressure, scaling, growth or factors other than heat alone
9. Typical composition including alloys if any
10. General physical properties, including class 30, 40, 50 or 60 and approximate hardness
11. General comments on service life of casting

It is not essential to report all of the listed information, and when desired all details will be kept confidential. It is hoped that a possible source of such information be furnished to serve as a basis for more detailed study by the research engineers conducting this investigation. It is expected that the following industries and the cast iron foundries producing for these industries will have and submit the desired information:

1. Valve and pipe
2. Petroleum refinery equipment
3. Paper mill equipment
4. Internal combustion engines
5. Steam engine and accessories
6. Turbine and power plants
7. Locomotive and equipment
8. Pump, evaporator, distillator, etc.
9. Chemical equipment
10. Furnace and firebox (*Please turn to page* 164)





Speeds Production of Brass Castings

AN INTERESTING example of how modern equipment and methods facilitate production and reduce cost of operation is presented in the prominent West Coast nonferrous foundry of the Repeal Brass Mfg Co., Los Angeles. The firm has specialized for many years in the production of high class plumbing castings. Recently for the same reason that affected nearly all foundries from east to west, the necessity of side tracking civilian orders, in favor of those emanating directly and indirectly from Washington, a considerable part of the plant facilities has been devoted to the production of certain castings needed in the prosecution of a world wide, and so far as the United States is concerned, a relentless war.

To cope with present and further anticipated increase in volume of war orders, the company officials decided to install a mechanized unit for 10 molders which would permit production of greater tonnage than formerly was possible with 15 molders. In addition the method and equipment would utilize less floor space, provide better working conditions and by proper manipulation of the sand, would insure more and better castings with improved surface appearance. Based on the anticipated lowered cost of operation, it was estimated that the equipment would be paid for in from 12 to 18 months operation.

Since sand plays an important part in the production of castings, and since mechanical equipment is essential to the proper preparation and control of a uniform and satisfactory grade, decision to install and operate a mechanized unit, was based largely on these two factors.

In general distribution of natural features, climate, scenery, mineral, oil, lumber and other resources, California in the popular idiom of the day seems to have hit the jack pot. From a foundry view point the situation is perfect, with a single exception. Explorers, miners, prospectors, desert rates with varying degree of success have uncovered nearly every type of geological formation and mineral deposit, but up to the present none of these has discovered a high class, natural molding sand. Most of the brass foundries in Southern California use sand from the East, shipped by boat down the Atlantic coast and through the Panama canal.

In the present instance it was found that a synthetic sand could be built up from local material, perfectly satisfactory in every respect and at greatly reduced cost through elimination of the high freight rate.

Molds are shaken out over a grating at the outer end of each roller conveyor line as shown in Fig. 2. The upper part of the grating frame contains two bumper bars bolted through the ends and easily replaceable when and if necessary through severe service. The empty flasks are lifted and placed on a second and high roller conveyor shown at the left which carries them back to the molding station. Castings, depending on size, either remain on the bumper bars, or fall with the sand on to the lower grating. The castings are hooked from the grating, loaded in wheel barrows and taken to the cleaning room.

An underground conveyor belt carries the sand to the boot of an elevator from which it is lifted 52 feet and discharged into the top of the 40-ton sand storage bin. An exhaust system in the underground tunnel removes smoke, steam and fines. Dampers at each grating entrance confine the volume of intake air to one, two or three gratings which may be in use at any given time. In this manner a relatively small amount of air is sufficient to suppress all

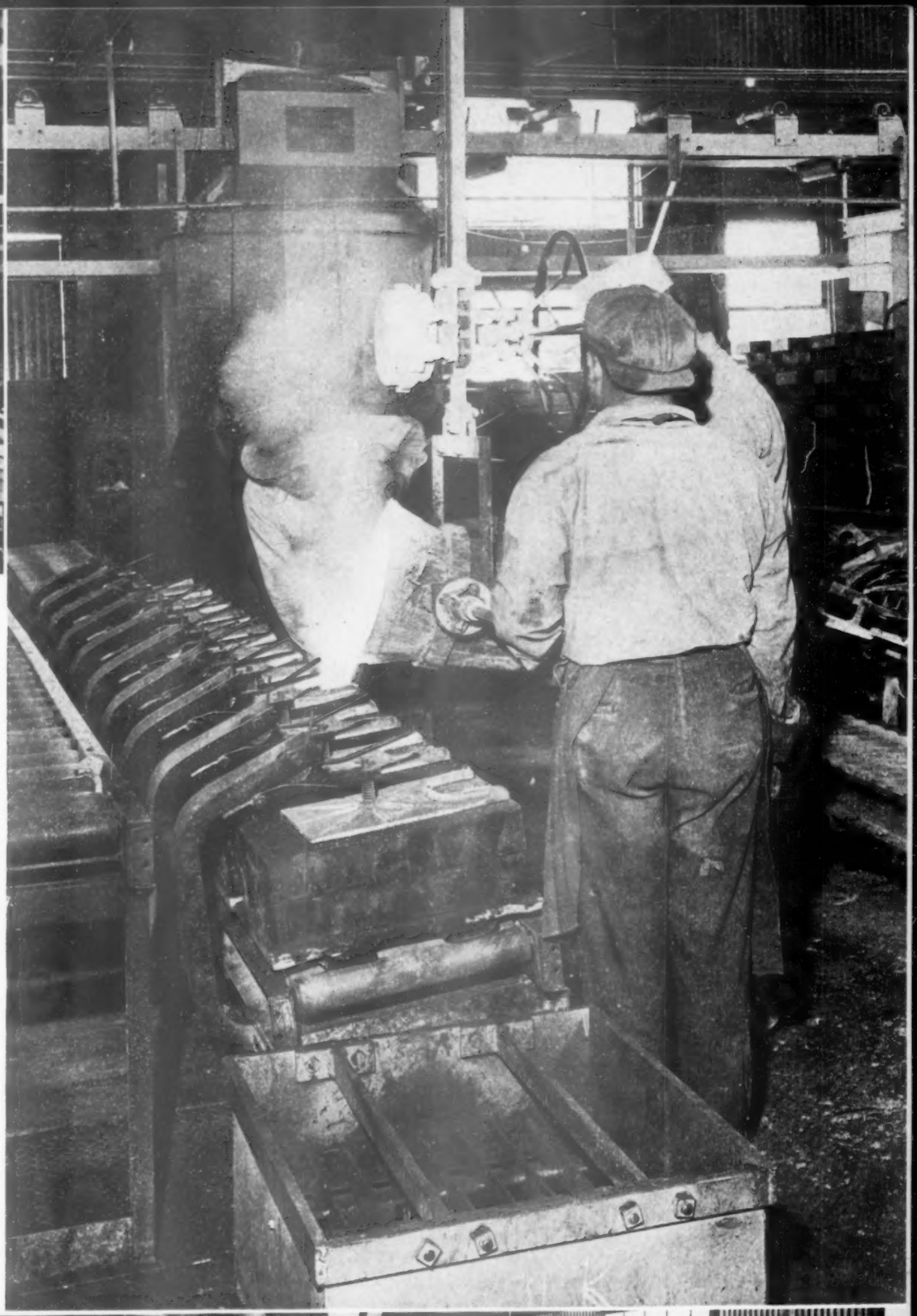
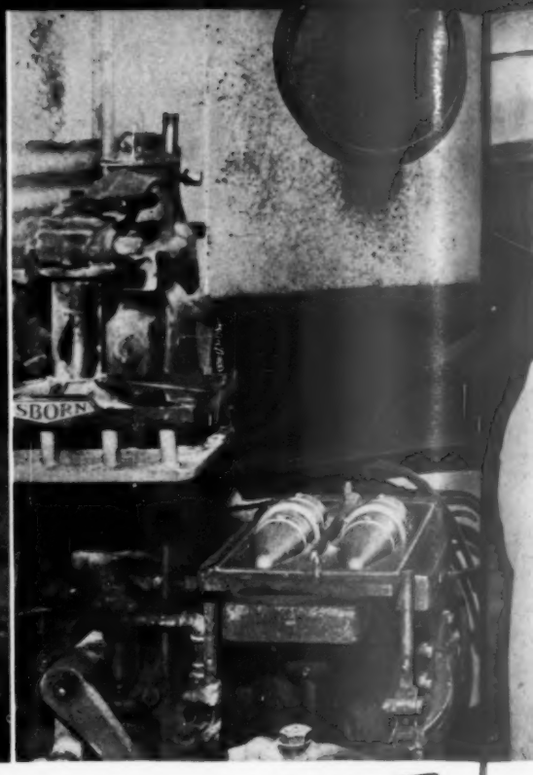


Fig. 1 (Upper left)—Metal is melted in a battery of gas fired furnaces and transferred by monorail to the various floors. Fig. 2 (Above)—Molds are shaken out over a grating at the outer end of each roller conveyor line. Fig. 3 (Right)—Instead of a weight or clamps a mechanically operated arm and cover plate holds the mold together during the pouring period. Fig. 4 (Below)—General view in the core room



dust which is developed at the shakeout stations.

Before discharge into the boot of the elevator, the sand passes over a magnetic pulley. Between the top of the elevator and the storage tank, the sand passes over a 6-mesh vibrating screen which removes core butts, stray bits of brass and other nonmagnetic refuse.

From the storage bin the cleaned sand is delivered in 1400-pound batches to a muller type sand mixer. The batches are measured automatically and accurately in suitable hoppers under the storage bin and over the mixer. Additional materials, new sand, cereal or clay bond and water designed to produce a sand that will conform to definite specifications of permeability, moisture content and green strength, are measured in suitable containers and incorporated in the mixture. Operating cycle of the mixer from full to empty is 2 minutes. The entire sand system, push button controlled, is hooded, housed and air exhausted with dampers on the exhaust outlets to insure cleanliness and proper control of the sand.

The prepared sand is discharged on to a belt feeder, then through an aerator on to an inclined belt distributing conveyor, shown to the left in Fig. 7. At the proper height

Fig. 5 (Upper left)—Castings are checked accurately with a number of gages. Fig. 6 (Above)—Each mold forms four castings. Fig. 7 (Far left)—Sand is prepared in modern compact equipment. Fig. 8 (Left)—Cores are made on a core blowing machine and dried in shells. Fig. 9 (Right above)—Cores are removed from the dryer shells and inspected on a long table

the belt travels horizontally over the molding station sand hoppers. Adjustable plows divert the sand stream into each of the five hoppers as required to maintain the supply. A double hopper serves two molders.

Instead of the usual measuring gate at the bottom, each hopper terminates in an open shelf, close to and at the same level as the top of the flask on the jolt squeeze type molding machine. A close preliminary study indicated in this particular instance, that with this arrangement the molder could fill the flask faster with a shovel than through a gate. This feature is shown in Fig. 6. Each molder makes from 30 to 40 molds per hour, depending on the size of the flask and the number of cores to be set.

Castings Closely Inspected

One red brass casting made on this unit weighs 2¼ pounds. The castings are finished in the company's machine shop where they pass rigid inspection before and after machining to close tolerance and where they are fitted with lead seal rings.

Metal patterns in pairs are mounted on a plate as shown in Fig. 6. Since the castings are symmetrical the same pattern unit serves for both cope and drag. Pattern for runner and gates is detachable and is used only in making the drag half of the mold. A single gate conducts the metal into each mold cavity, but the runner extends about 3 inches beyond the gates at one end, and almost to the end wall of the flask at the opposite end. The first extension is a precautionary feature designed to catch and hold any small quantity of sand, dust, or other foreign material that inadvertently might be carried in with the first dash of metal. The second extension, provided with a strainer core at the outer end where the sprue delivers the metal, is situated in this position to facilitate the pouring operation. The lip of the ladle can be held close to the sprue opening. If the sprue was in the center of the cope, the logical place in a program designed solely for reducing the amount of metal required to fill the mold, the ladle would have to be held high.

Each pattern forms two castings, or a total of four castings for each mold. A raised band around the center of each pattern leaves a depression in the mold which serves to locate the one-piece dry sand core and anchor it firmly in place. The principle is employed extensively in molding plumbing and other classes of castings. Static pressure exerted against the core in one mold is offset by equal pressure exerted against the core in the opposite mold. A high degree of accuracy is essential in machining pattern and corebox to insure a tight fit when the core is placed in the mold. The collar around the center of the core not only locates the core accurately in the mold, but it also serves as the inner boundary of the casting and thus prevents the formation of an unsightly fin.

As a compensating feature in the local sand situation, core sand is cheap and plentiful in California. Cores for the caps are made from a fine grain silica sand bonded with oil, a combination which imparts a smooth, clean surface to the interior of the casting. Core for the cap and for other castings are made on two core blowing machines. The metal corebox, split longitudinally through the center is placed on the table of the machine and then raised and automatically locked in position under a perforated plate. Perforations in the plate coincide with small openings in the top of the corebox. When the operator opens a valve, the core sand under air pressure in the magazine above, is forced through the small openings into the corebox. The operation is practically instantaneous. The cores are blown directly into the core dryer, each dryer serving as the drag side of the corebox.

The corebox is then lowered and pulled forward toward the operator who removes the top half of the box leaving the dryer and core ready for the oven. The core with dryer is placed on a rack (*Please turn to page* 163)

By GEORGE A. TIMMONS
Metallurgist
Climax Molybdenum Co.
Detroit

Theory of Shrinkage in GRAY CAST IRON

ANOTHER production foundry found that solidification of a 4-inch cube most nearly duplicated casting conditions existing at a critical location on one of its motor blocks. In determining characteristics of a new iron, the 4-inch cube was cast and sawed in half after solidification was complete. If the saw cut revealed a shrinkage cavity at the center of the cube it could expect to find defects at the critical location in the motor block. When the cube was sound, motor blocks poured with the same composition and pouring temperature were also found to be sound. Figs. 7 and 9 show the method of gating this casting and the types of cavities produced by different compositions.

These three castings, not being fed by risers or heads, actually measure what might be termed the "self-feeding" tendencies of an iron and can be used to study such variables as composition and pouring temperature. Having been requested to co-operate on a production problem with the foundry using the 4-inch cube, our laboratory had the opportunity to conduct several experiments using this type of test specimen to determine the shrinkage characteristics of irons of varying compositions.

Molds used for the production of these castings were made of baked sand. The bottom consisted of a slab 2 inches thick which contained the gates. The sides of the mold were 4 inches thick and the cope consisted of a 1 inch slab. Directly above the casting the cope was provided with a ½ inch diameter hole to allow for the escape of displaced air. The mold was filled completely for each test, allowing some of the metal to spill out through the vent. The usual practice was to allow the casting to cool to room temperature, then cut the cube in half on the vertical plane of symmetry which bisected two of the sides. This saw cut usually exposed the shrinkage cavity whenever one was formed. However, saw cuts made along the other vertical plane of symmetry, perpendicular to the first, showed one saw cut was not always sufficient to reveal the true nature of the shrinkage cavity and it was doubtful if any number of cuts could readily reveal the characteristics of the porous section.

Due to these circumstances the extent of the shrinkage zone could not be ascertained sufficiently accurately to provide even a qualitative evaluation of the effects of such variables as composition, pouring temperature and cooling rate upon the formation and size of the porous section. The measurement of the "void volume" of the shrinkage cavity seemed to offer the best possibility of

Table I

Effect of Phosphorus and Pouring Temperature

Phosphorus Per Cent	Void Volume c.c.	Pouring Temperature Degrees Fahr.	Void Volume c.c.
0.015	0.35	2400	1.9
0.036	0.43	2550	2.65
0.073	2.12	2700	3.4
0.104	2.62	2850	4.5
0.123	2.96		
0.74	12.75		

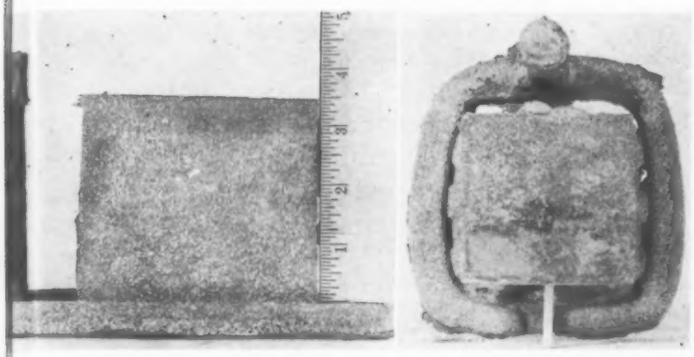


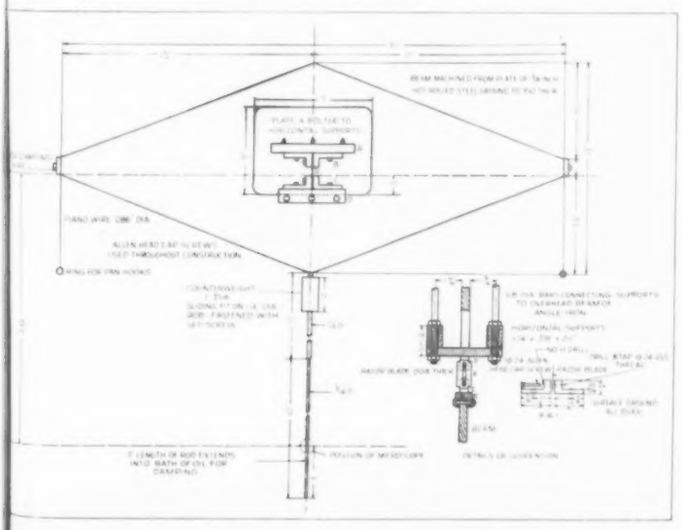
Fig. 7—Side and top views of 4-inch cube casting used to determine shrinkage characteristics of gray cast irons

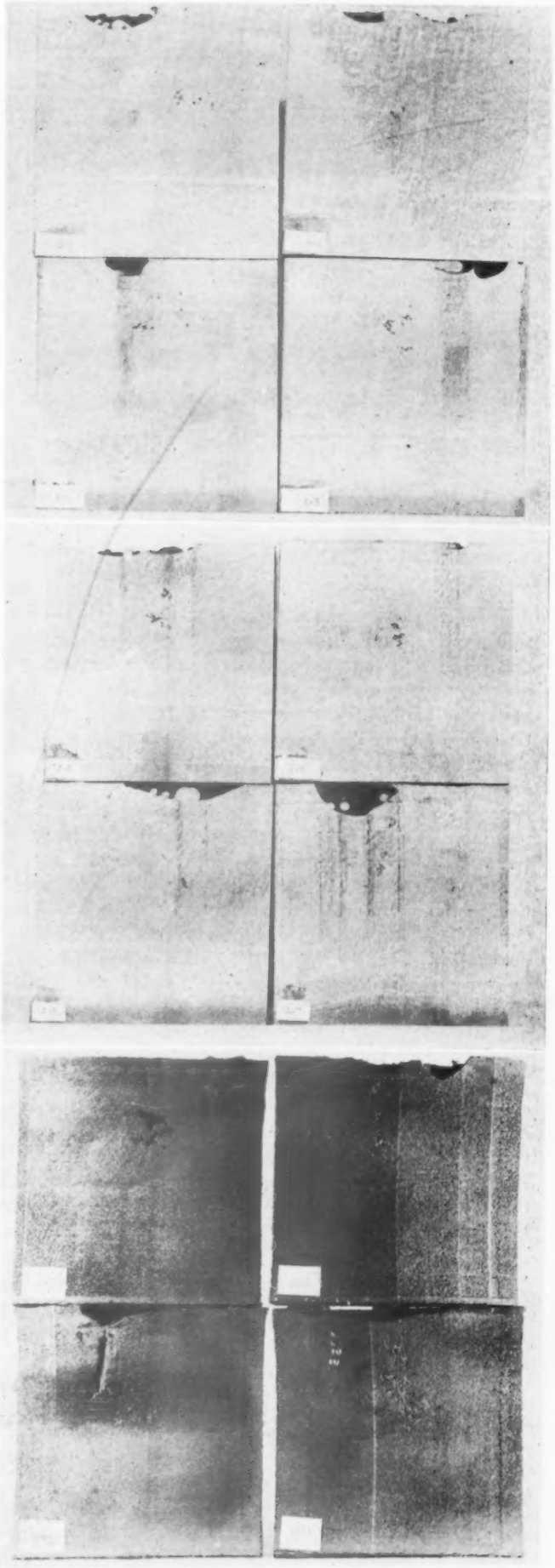
obtaining quantitative data needed to evaluate the effects of the variables. In order to obtain a value for the "void volume" it was necessary to determine the total volume and total weight of the 4-inch cube casting and the density of a sample of "sound" iron from a portion of the block containing no voids or porosity. The total weight of the 4-inch cube divided by the density of sound iron would then yield the volume of sound iron in the block. Subtracting the volume of sound iron from the total volume of the cube would give the "void volume".

To obtain the total weight and total volume of the 4-inch cube it was necessary to weigh the casting in air and in water to within 0.010-gram. The total weight of each 4-inch cube was approximately 8000 grams. It was necessary to build a special balance which was capable of such sensitivity. Accordingly a high capacity precision balance built upon the principle of a flexure plate was designed and constructed. When completed this balance had a sensitivity of 1 part in 1,000,000 with a load of 16 pounds on each arm. A sketch of the balance is shown in Fig. 8.

After the castings had solidified and cooled to room temperature they were carefully ground to remove the sand. They were then weighed (*Please turn to page* 165)

Fig. 8 (Below)—Sketch of high capacity balance used for determining void volumes in 4-inch cube castings.
Fig. 9 (Right)—Locations and types of shrinkage cavities found in 4-inch cube castings





Skill Is Required to Produce Steel in a Converter

Some time back you published an article on making steel castings in a converter furnace without the use of electricity. We shall appreciate information on the building of a furnace of this type.

In the converter method for making steel, air is blown through a quantity of molten iron contained in a cylindrical vessel, called the converter lined with refractory material and open at the upper end. The vessel is supported on horizontal trunnions so that it may be swung through an arc of approximately 90 degrees, that is from a horizontal to a vertical position. The vessel is tipped to the horizontal position to receive a charge of molten metal from an adjoining cupola, or any other type of melting medium. The converter is not a melting device. Its sole function is to convert molten gray iron into steel.

Air is admitted while the vessel is in an upright position. At the end of the conversion period, the vessel is tipped back to the horizontal position and the steel is poured into a waiting ladle. Converter vessels fall into two general classifications, bottom blow and side blow. The first is the original type invented by Bessemer and still known by that name. In this vessel the air enters the metal at the bottom through a number of small tuyeres. For foundry use, this type has been superseded by the side blow converter where the tuyeres are located at or near the upper level of the bath. So far as building a converter unit is concerned, it is only fair to point out that it is altogether outside the scope of any person without the necessary skill and experience and an intimate knowledge of the subject.

Will Melt Gray Cast Iron in Small Diameter Cupola

We are setting up a small cupola, 27-inch shell lined to 18 inches, and provided with four 3-inch diameter tuyeres from a wind box that surrounds the shell. Tuyeres are 10 inches above the sand bottom. We shall appreciate your opinion on the proper size and distribution of tuyeres, volume and pressure of blast, weight of charges and any other features of interest, including the amount of iron we may expect at each tap.

Size, shape and position of the tuyeres in your cupola conform to accepted standards. With a blast pressure of 6 ounces and a volume of 500 cubic feet per minute the cupola should melt about 2000 pounds per hour. In the Aug. 1942 issue of THE FOUNDRY an Australian foundryman presented a description of melting from 2500 to 2800 pounds per hour in an 18-inch cupola. Up to the present we have no record of a duplication of this production. One reason probably is that only a small number of 18-inch cupolas are in existence and the usual heat does not amount to 2000 pounds.

Several contributing factors affect the speed of melting. These include character of the coke, thickness of charges and the size of individual pieces of iron in the charge. Coke bed should extend approximately 30 inches above the tuyeres and should be well burned through when charging commences. Iron should be broken into small pieces with 150 pounds and 20 pounds of coke to a charge. To keep the furnace melting at capacity and to insure a clean drop it is advisable to add 5 pounds of limestone to each charge. If the furnace is operated for more than an hour the slag should be drawn off regularly, either through the spout or through a suitable slag hole 2 or 3 inches lower than the tuyeres at the back. Without a slag hole the cupola will hold about 300 pounds of molten iron in the well. With the slag hole open, this amount will be reduced to about 200 pounds.

Brass Elbows Will Not Resist Required Pressure Test

We are having difficulty in obtaining elbows made from 85-5-5-5 alloy which will withstand a 100-pound pressure test. We pour at 1900 degrees Fahr., have tried varying amounts of ingot and remelt, experimented with molding practice and with runners and gates without results. We are sending a defective casting for examination, and would like to have some suggestions on how to get satisfactory castings.

Examination of the casting indicates the trouble is due to improper gating. The castings are not being fed sufficiently to compensate for shrinkage occuring during solidification. That is indicated clearly in fractures of the casting, and we suggest you employ regular routine fracturing of a casting from each heat or every second or third heat. Break it at several places and study the color and structure of the fractured section. Lack of feed will exhibit a fracture that is uniformly granular in structure showing rusty or discolored appearance in spots or through the center section. Gassing will result in small pear-shape holes or pinholes as they sometimes are called, in the section last to cool. The interior of the holes or bubbles may in some instances be discolored but usually are bright.

Your pouring temperature is about right, but to secure sound castings it will be necessary for you to change the pattern mounting so that the elbows will be gated at the heaviest section. In turn the gate should be connected to an adequate riser. One riser may be arranged to feed

two castings, and the risers must be higher than your present 3-inch cope will provide. Use at least a 4-inch or preferably a 5-inch cope to get more height. Even the best provision for proper feeding may be found inadequate at times, particularly when the metal is somewhat sluggish—say from the last metal out of the pouring crucible. Consequently, it sometimes is wiser not to attempt to use all the metal in the pot when pouring a large number of molds.

Wants Information on Aging Of Zinc-base Castings

Can you give us any information on how to age proprietary zinc-base castings with which we have considerable trouble?

The alloy you mention is one of the several produced for die casting purposes, and contains about 4 per cent aluminum, 0.04 per cent magnesium, 0.03 per cent maximum copper, and remainder zinc. A modified type has practically the same composition with the addition of 0.02 per cent nickel. You do not state what trouble you are having with the alloy, and why you desire to age it, but presumably both relate to castings whose dimensions must be held within close limits. In such cases the usual procedure is to subject the castings to a stabilizing anneal by heating to 100 degrees Cent. (212 degrees Fahr.) for 4 hours, and air cool to room temperature.

The same results may be secured by heating to 70 degrees Cent. (158 degrees Fahr.) for 12 hours, or to 85 degrees Cent. (185 degrees Fahr.) for 6 hours, and air cool to room temperature. Possibly your trouble may arise from japanning or other treatment where the castings are subjected to elevated temperatures. The particular alloy in question will withstand temperatures of 350 degrees Fahr. for 2 hours without adverse effects, but above that temperature there is a rapid change in growth and a loss in impact strength.

Describes Methods To Reclaim Castings With Defects

We would like to have information on repairing defective castings for machining. Especially useful would be a means of repairing that will hold pressure.

Several methods are available for reclaiming defective castings such as welding, impregnation, and filling. Welding may be either fusion or low temperature type. In the fusion type, the edges of the defect are raised to the melting point by the torch or arc along with the material forming the welding rod which usually is the same composition as the casting. In low temperature type welding the casting is heated to 900 to 1400 degrees Fahr. along with a special composition welding rod. Bronze welding using a rod containing 60 per cent copper, 40 per cent zinc, and small amounts of nickel, manganese, etc., requires a temperature around 1600 degrees Fahr.

Impregnation which involves forcing a solution into a casting with all but one opening closed, under such pressure that the solution penetrates into the porous sections. Solution may be comprised of synthetic resin which requires baking in place to attain proper imperviousness, or sal-ammoniac which is allowed to air dry. Silicate of soda (water glass) also is used, but mainly for aluminum castings. Impregnation generally is employed after the casting has been machined.

Filling involves use of special iron powders or cements which when mixed with water form a putty-like material which is pressed into the defects. It should be used to repair only surface blemishes, etc. where only factors of appearance of the casting and not physical properties are concerned.

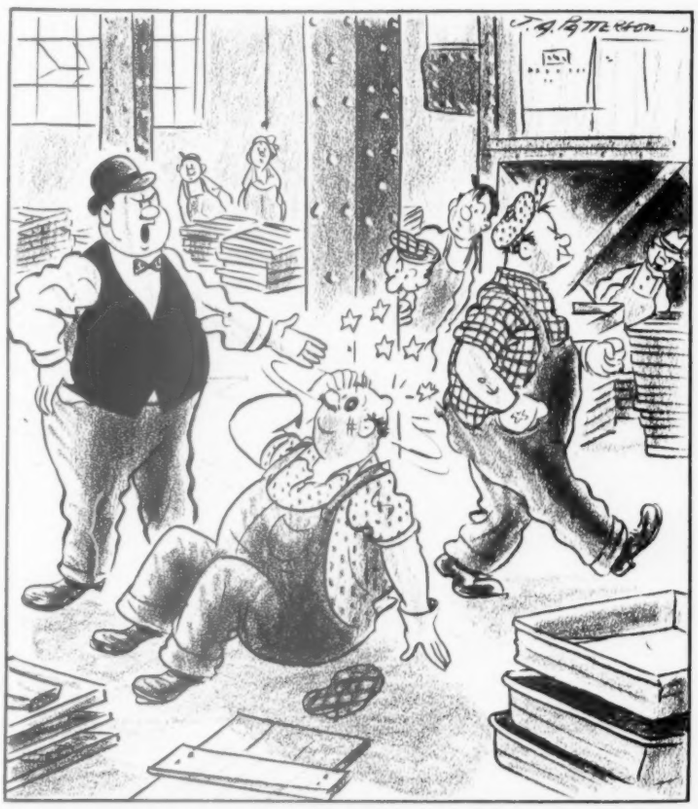
Has Trouble With Leakage in Cast Bronze Fittings

We are making cast bronze elbows, and have had considerable trouble with leakers. We have tried changing the patterns and gating on the outside of the curve and also on the inside of the curve; use of a 6-inch head and a 9-inch head; risers on individual castings, varied the size of gates, etc., but still get leakers.

The fact that changing the position of the riser relative to the heavy section of the casting has not corrected your trouble from leakers, does not prove necessarily that the change was not beneficial. It does indicate the probability that the metal was not led into the riser and casting in a way that will insure the casting freezing first followed by the riser.

Obviously if the elbows were fed properly with good, clean metal, they would be as good as your other castings. A study of the fractures of castings which have been sectioned will indicate whether feeding is being accomplished. It also will indicate whether the defects are caused by gas absorption during melting, bad cores, hard ramming, etc.

GANGWAY! By J. A. Patterson



"Whatta ya' mean ya' got a piece of sand in your eye?"

Use Aluminum Scrap As Deoxidizer

We are contemplating use of scrap aluminum for deoxidizing our steel castings. The type of scrap available would be from washing machines and vacuum cleaners. Can you tell us what the aluminum content would be in such scrap?

It is not possible to state just what aluminum content might be expected in scrap from washing machines and vacuum cleaners, since the compositions used by various manufacturers may differ considerably. For example one alloy used for permanent mold castings of that type contains 7 per cent copper, 1.2 per cent iron, 1.7 per cent silicon and remainder aluminum or about 90 per cent. Another maker may use the 5 per cent silicon, 95 per cent aluminum alloy. We believe that the best policy would be to have an analysis made on a sample of the material in the form you are going to use it.

Plane Casting Must Be Machined

We are enclosing a small Y adjusting clamp for a carpenter's plane which must be soft enough to machine readily between the ears. However, you will note that both ears are chilled. The casting was made from a mixture of 150 pounds pig iron containing 3.60 per cent silicon, 200 pounds sprues and gates, and 150 pounds good machinery scrap. Castings analyze 3.00 per cent silicon, 0.70 per cent phosphorus, 0.31 per cent combined carbon, 2.88 per cent graphitic carbon. We are melting in a 42-inch cupola lined down to 30 inches. Bed uses 700 pounds coke bringing it 40 inches above tops of tuyeres which are 24 inches above bottom. We are melting fifteen 500-pound charges per day with 70-pound coke splits in 1½ hours after the wind is on, and iron is hot. We have tried various mixtures up to 400 pounds of pig and 100 pounds of scrap without results. Also a 2 per cent nickel addition in the ladle did not stop the chill. Sand is No. 1½ Albany and used dry.

A temporary relief which will enable you to machine the small adjusting clamps is to place them in a small oven or furnace where they can be heated to 900 to 1000 degrees Fahr. or a dull red, and allow them to cool in the furnace. However, that is just an expedient. The trouble should be remedied by determining the source, and effecting a permanent cure. While we hesitate to question the analysis given for the castings, calculation indicates that with the machinery scrap containing 2.50 per cent silicon which is high, the resulting iron should show a silicon content around 2.65 per cent. But even at that silicon content the fracture of the ⅛-inch section should be gray and not white.

You mention that you are using a 42-inch cupola lined down to 30 inches, and wonder if you still are using the same blower. A 42-inch cupola has nearly twice the melting rate of a 30-inch cupola, and unless a gate is installed in the blast pipe to reduce the amount of air to the cupola, you are blowing excessively hard. Such procedure is wasteful of power to operate the blower, and raises the level of the bed much higher than necessary, wasting coke. You state that your tuyeres are 24 inches above the bottom which seems out of line for a foundry making light castings. A height of 8 to 10 inches should be ample, permitting a saving of 170 to 195 pounds of coke in the bed.

It also seems to us that you are using considerably more coke in your splits than is necessary. Reese states that 9½ pounds of coke per square foot of area should be sufficient for a 36-inch cupola. For a 30-inch cupola this would be about 47 pounds or say in round numbers 50 pounds. He also says that the ratio of iron to coke may range from 8 to 1 in the case of high steel scrap content to 12 to 1 in the case of little or no steel scrap in the charge. Hence, the weight of your charge could be 600 pounds with 50-pound coke splits.

If you are satisfied with your present cupola practice and do not desire to make any changes, possibly you might be able to eliminate the chill in the castings in question through ladle additions.

Reduces Sulphur in Cupola Iron

We are planning to use soda ash in our ladle mix, and would appreciate information on the amount to use to reduce the sulphur content in our iron.

Since you do not mention what reduction in sulphur content is desired, no definite statement can be made on the amount of fused soda ash needed. That material may be added to the charges in the cupola or in the mixing ladle or in both. Most effective results generally are obtained by the latter procedure. Where only a slight reduction of sulphur content is wanted, say 1 to 1½ points, or from 0.110 to 0.095 per cent desulphurization may be accomplished by adding soda ash to the cupola in the proportion of 2 to 6 pounds per ton. By close control of cupola conditions greater amounts of sulphur can be removed with additional quantities of soda ash. Addition of soda ash to the cupola also is claimed to give cleaner iron and promote combustion reactions.

More effective sulphur removal is accomplished in the mixing ladle since no slag is present to produce side reactions. Amount of sulphur removed will depend upon the quantity of soda ash added, and will vary from 25 to 40 per cent of that in the iron coming over the spout. With 4 pounds per ton added in the ladle, the reduction is around the lower value while with 6 pounds per ton, the reduction is at the high figure. To show the efficacy of sulphur removal an example is cited whereby a soft iron containing 2.47 per cent silicon and 0.128 per cent sulphur was treated with 2 pounds of fused soda ash in the cupola and 5 pounds in the ladle. Sulphur was reduced to 0.088 per cent with an increase in transverse strength, tensile strength, and deflection.

Castings Crack and Warp in Mold

We are making stoveplate, and are having trouble with castings cracking in the mold and warping. Also the castings show a great tendency to chill which is not confined to thin sections. We are using our sand as dry as possible, and believe the metal condition is responsible. We melt in an electric furnace with 1000-pound charges composed of 200 pounds miscellaneous light scrap; 250 pounds No. 1 heavy scrap; 200 pounds car wheels; 250 pounds foundry returns; 100 pounds pig iron containing 3.85 per cent silicon and 1.09 per cent manganese; 14 pounds 50 per cent ferrosilicon; 8 pounds 27 per cent ferrophosphorus, and 10 pounds petroleum coke.

A rough computation of the composition of your final iron indicates that it contains around 2.60 per cent silicon; 0.85 per cent phosphorus, 0.46 per cent manganese; total carbon over 3.50 per cent, and sulphur over 0.100 per cent. While the manganese content is a trifle low, the composition is such that it should serve satisfactorily. However, we believe that the additions of ferrophosphorus and petroleum coke are not necessary, and suggest that you eliminate those gradually; observing the effect if any, on the final iron as you go along.

Difficulty with cracking and warping seems to indicate pattern design as the fault, although such trouble at times can be corrected through a survey of gating procedure. Your present methods may not permit uniform contraction or may be creating hot spots. You do not mention any trouble with sand burning on to the castings, so presumably your pouring temperatures are not too high. Possibly you may be using a highly refractory molding sand which may withstand high temperature pouring, or you may permit the iron to cool in the ladle before pouring.

High superheat is not always desirable. With some mixtures superheating is beneficial, and with others detrimental. Consequently, it may be worth while to experiment, and observe what results are obtained with and without holding the metal at high temperatures in the furnace. We note that you are adding

(*Concluded on page* 86)

3 Million Tons of iron and steel scrap are wanted every month . . . Are you doing your part to help America win her battle of production?

CONSERVATION AUTHORITIES RECOMMEND THESE 8 STEPS TO GET IN THE SCRAP

1 Put some one individual in charge of scrap in all departments of your business and GIVE HIM AUTHORITY TO ACT.

2 Comb the plant and yards for dormant scrap, abandoned equipment, old boilers, pipe, moulds, obsolete dies and parts, material now being destroyed which has salvage value.

3 Survey all plant equipment, particularly idle standby or discarded machines, with a view to applying or converting them to useful production.

4 SEGREGATION:
Identify, classify and segregate scrap and supervise its handling to avoid contamination. This will increase its value.

Provide separate containers, clearly marked, for each class of scrap material.

Repair or rework worn or broken cutting tools Keep unusable small pieces and turnings segregated. Even high speed steel grinding dust is valuable.

Dismantle discarded equipment promptly into its components—electrical, fastenings, lumber, etc.—so that these parts may be utilized or scrapped.

Sort blanks, short ends, cut-downs, clippings, etc., for possible reuse for smaller parts made in the same or other departments.

Recover and reclaim used cutting oils, lubricants, surplus paints and spray finishes.

Sort sweepings and miscellaneous waste to recover scrap values.

5 Constant reminders in the form of posters, illustrations of right and wrong methods, pay envelope enclosures, house organ publicity, etc., are potent aids to the conservation program.

6 Release for scrap, obsolete engravings, electrotypes, and standing types for catalogs, forms and advertising material.

7 Inspect all refuse to detect avoidable waste and excessive rejections. Educate production executives to correct such conditions at the source.

8 For information and assistance on special phases of conservation and salvage communicate with Industrial Salvage Section, Conservation Division, War Production Board, 9th Floor, Washington Gas Light Building, Washington, D. C., or with nearest regional office

The metallurgical experience of our technical staff is available to aid you in these and other technical phases of metal salvage.

KEEP SCRAP MOVING INTO WAR PRODUCTION!

THE INTERNATIONAL NICKEL COMPANY, INC. **67 WALL STREET NEW YORK, N. Y.**

(*Concluded from page 84*)

all your ferrosilicon in the furnace at present, and suggest that you try adding part of it in the ladle. In other words charge say 7¾ pounds of the 50 per cent alloy in the furnace, and to each 100 pounds of molten iron in the ladle add 5 ounces.

Your attention also is directed to the fact that scrap car wheels are not the most desirable component of a charge for light work since they are low in silicon and high in sulphur. However, in these times desirable raw materials are at a premium to say the least, and we must make the best of what is available. If it is at all possible, we suggest that you hold the scrap car wheels for use in heavy section castings, and replace them in the light work by increase in the miscellaneous and heavy scrap additions.

For example you might try a mixture composed of 350 pounds miscellaneous light scrap; 300 pounds heavy; 250 pounds return scrap, gates and sprues, 100 pounds pig iron, and 8 pounds 50 per cent ferrosilicon. That of course, is only one of a number of possible variations which might be worked out. If pig iron is not too scarce, it may be advisable to increase that material to 200 or 250 pounds with a reduction in ferrosilicon used.

Raise Heat of Iron In the Cupola

Our cupola lined to 30 inches does not melt the iron sufficiently hot when the charge contains varying amounts of steel from 30 to 65 per cent. We shall appreciate advice on the proper blast volume and pressure for a cupola this size, also height, size and number of tuyeres, distance from bottom to charging door, height of bed and any other pertinent information on cupola construction and operation.

If the cupola melts gray iron satisfactorily, an approximately 10 per cent increase in the amount of coke on the bed and between the charges will function satisfactorily where the charge contains varying amounts of steel. Taking your questions in the order of presentation, the following brief comment is offered for your consideration: A cupola lined to 30 inches has a normal melting capacity of 7000 pounds per hour where the blower delivers 1500 cubic feet of air per minute at a pressure of 10 ounces. Height, size and number of tuyeres are not important factors. The only really essential feature is that they are of sufficient area to admit the air readily. Where the iron runs in a continuous stream, the tuyeres are set from 4 to 6 inches above the bottom to conserve the coke bed.

Where it is necessary or advisable to collect a definite amount of iron in the well between taps, the tuyeres are set at the proper height. In a 30-inch cupola in the ordinary jobbing shop the bottom of the tuyeres is about 12 inches above the sand bed. A satisfactory tuyere forms a continuous opening 3 or 4 inches high. However, many cupolas work satisfactorily with six or eight tuyeres 4 x 6 inches. Distance from the bottom to the charging door in a 30-inch cupola usually is about 10 feet. So far as effectiveness is concerned, a cupola with a charging door 6 feet above the bottom is satisfactory. Increase in height does not increase the melting capacity. Usual height of coke bed is 30 to 36 inches above the tuyeres at the time charging commences. This feature also is variable depending on the character of the coke, the weight of the charge and the blast pressure. The coke splits according to Reese, should be about 50 pounds and the iron charges 8 times the weight of the coke.

Facing for Smooth Brass Patterns

We shall appreciate information on how to make smooth brass patterns. We use a fine grade of sand, but the castings are rough.

In referring to the rough castings you do not state whether the casting surface is rough all over, or is confined to corners, pockets, areas on the side walls, or areas in front of the gates. Each manifestation may indicate a different cause. If the casting is clean but rough in the sense that the surface is pebbled, a finer sand or a coating of one of the commercial facings is required. If the rough spots appear only in corners and pockets it may be taken as evidence that the metal did not lie quietly in those areas. The sand may be rammed too hard or may need to be vented with a wire. A rough spot in front of the gates may be caused by an improperly designed or improperly placed gate, or may be caused by sand that is not strong enough or refractory enough to resist the force of the metal stream.

So far as the actual molding practice is concerned the details do not differ to any extent from those used on any nice casting. In many instances a well made green sand mold is all that is necessary. In other instances it may be advisable to shake blacking or plumbago through a bag over the surface and then stamp the pattern back. In extreme instances the mold is blacked, stamped, sprayed with molasses water and then skin dried either with a torch or with a small charcoal fire. Provided the sand is satisfactory, fine sand for facing and coarser sand for backing, moisture not over 5 or 6 per cent, rammed properly and vented where necessary, this treatment should produce a clean, smooth casting.

Metal Burns Into Bushing Core

We are making a cored bushing varying from 4 to 14 inches in diameter, and are having trouble with metal eating into the cores. Our present core sand consists of 20 measures of coarse sharp sand, 15 measures of fine sharp sand, 5 measures of molding sand and 2 measures of proprietary rosin binder.

Burning in is not necessarily the result of the wrong core mixture as it might be due to gating which causes a combination of heat and abrasion that defeats the purpose of coating the cores, assuming that you do the latter. A good coating is comprised of graphite suspended in molasses water which is brushed on, or the core is dipped into the solution. Of course, the core is dried thoroughly after coating. Special core coating materials also are available.

While you do not mention the wall thickness of the bushing, it appears that some of them may be quite heavy, and with these it might be well to change your core mix so as to obtain a much harder core than you now are using. If the surface of the core indicates that the burning appears in the same relative location each time, look into the gating. Try changing it so that the molten metal will flow freely around the core without digging into one place. You may be pouring your metal too hot. Possibly your trouble is scabbing rather than burning in, due to the core being rammed too hard in spots.

Trouble Is Caused By Slag Action

We are melting red brass compositions in silicon carbide crucibles, and have trouble with a groove forming about 1½ inches from the top or at the flux line. The groove eventually wears until the crucible wall is only ¼-inch thick at that point, and then breaks off after about 41 heats. Metal is poured at 2300 degrees Fahr., and sand and glass are used as a flux.

While you do not state the composition of the alloys being melted in the silicon carbide crucibles, the description of your trouble indicates that considerable lead is present. Since at elevated temperatures lead oxide reacts with silicon carbide to form silicate, the presence of additional flux only aggravates matters. Hence, it is suggested that you leave out the sand and glass, and see what results are obtained. If cutting still occurs, you will have to use a different type crucible for those alloys

Buell Dust Recovery Systems help put it there

High Explosives are "booming" these days. America's arsenals are turning out astronomical quantities of bombs, shells and torpedoes...every one with a deadlier-than-ever "boom" for our enemies.

Sulphuric acid is important in the manufacture of explosives, but absolute purity of the acid is essential. Buell Dust Recovery Systems are used in conjunction with the contact method of making sulphuric acid because their high efficiency in removing contaminating flue dust from the sulphur dioxide gas assures purity in the finished product.

This is just one of many ways in which versatile Buell Dust Recovery Systems are helping industry achieve its war production goals by preventing contamination and salvaging critical materials for re-use. The van Tongeren "shave-off"—an ingenious design feature found only in Buell cyclones—insures exceptionally high collection efficiency, low operating cost and long life. Buell cyclones have no moving parts and require little or no maintenance or attention.

Buell Dust Recovery Systems easily handle high temperature gases, and can be installed for any desired capacity from 300 c.f.m. up.

Factual 28-page book. Write for Bulletin F-43.

Memo to:
FOUNDRIES
Buell Dust Recovery Systems are widely used in connection with
SHAKE-OUTS
CRACK-OFFS
TUMBLING BARRELS
GRINDING AND BLAST FINISHING OPERATIONS
to reduce hazardous dust nuisances and to reclaim valuable material for re-use.

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DUST RECOVERY SYSTEMS

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BUY WAR BONDS AND MAKE THE AXIS BITE THE DUST

men of industry

JOHN W. BOLTON, who will deliver the first American Foundrymen's Association foundation lecture at the St. Louis convention, April 28-30, is director of metallurgical research, Lunkenheimer Co., Cincinnati. Mr. Bolton has made many contributions to the development of both the gray iron and nonferrous branches of the foundry industry. He has served on many committees of the A.F.A., the A.S.T.M., the A.I.M.E. and the A.S.M., and at present is chairman of committee A-3 on cast iron of the American Society for Testing Materials. He has presented many papers before technical societies and has contributed much to the literature of the foundry industry through articles in THE FOUNDRY and other members of the business and technical press. He is the author of *Gray Cast Iron* published several years ago. In recognition of his contributions to the industry, he was awarded the John A. Penton medal of the American Foundrymen's Association at the annual convention held in Milwaukee, in 1937. Mr. Bolton has been continuously engaged in metallurgical research since he was graduated from Rose Polytechnic Institute, Terre Haute, Ind., in 1918. In 1929 he was awarded the degree of master of science and in 1925 received the honorary degree of chemical engineer. He has served as chemist with the Procter & Gamble Co. at Kansas City, Mo., and Cincinnati, as metallurgist with the Niles-Bement-Pond Co., Hamilton, O., and Frank Foundries Corp., Moline, Ill., and as chemist and metallurgist with the Lunkenheimer Co.

♦ ♦ ♦

Wilson H. Moriarty has been appointed assistant to the president and **Walton L. Woody,** has been appointed assistant to the president in charge of the Sharon, Pa., and Melrose Pork, Ill., steel casting plants of the National-Malleable & Steel Castings Co., Cleveland.

Mr. Moriarty, who joined the company 23 years ago, was graduated from Case School of Applied Science, Cleveland, in 1918 and in World War I served as an officer in the heavy artillery. After a training period he became resident inspector at the Cleveland plant and later held similar positions in the East St. Louis and Chicago plants. In 1927 he was appointed chief inspector for all of the company's plants and 3 years later was made sales engineer at the Cleveland plant. In 1939 Mr. Moriarty became that plant's sales manager. He was promoted again in June, 1942, to the position of assistant to the first vice president.

Mr. Woody joined National Malleable's Indianapolis plant in 1914, immediately after graduation from Rose Polytechnic Institute, Terre Haute, Ind. In the same year he was transferred to Cleveland and established the company's first chemical laboratory. He later became metallurgist and assistant superintendent in Cleveland, and in 1925 was made plant manager. In 1926 he acted as manager of the Chicago plant, but returned to Cleveland later the same year and remained until 1938 when he was made plant manager at Sharon, Pa., his present headquarters. Under Mr. Woody's direction the Sharon and Melrose Park plants are completing expansion programs to take care of steel castings for tanks and anchor chain for the Navy, in addition to their usual railroad work. He also directed the modernization of the Cleveland, Sharon, and Melrose Park plants. Mr. Woody is a director of the American Foundrymen's Association, and a past president of the Northeastern Ohio chapter of the A.F.A.

♦ ♦ ♦

Chester V. Nass recently has been appointed manager of the foundry division, Pettibone Mulliken Corp., Chicago. Mr. Nass, who for the past 14 years has been associated with Fairbanks, Morse & Co., Beloit, Wis., was born in Granville Ferry, Nova Scotia in 1903. He was graduated from Tufts college in 1923 with a bachelor of science degree in chemical engineering. In that year he became assistant metallurgist for the

(*Continued on page* 90)

John W. Bolton

Wilson H. Moriarty

Walton L. Woody

Chester V. Nass

Woodward

Uniform PIG IRON

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WOODWARD, ALABAMA

America's Largest Completely Integrated and Entirely Independent Merchant Iron Producer

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(*Continued from page* 88)

Ohio Brass Co., Mansfield, O., and advanced to the position of plant metallurgist. In 1928 Mr. Nass became associated with the Humphreys Mfg. Co., Mansfield, resigning the following year to accept the position of brass foundry superintendent with Fairbanks, Morse & Co. Mr. Nass has been active in the affairs of the American Foundrymen's Association and at present is vice chairman of the brass and bronze division and a member of the executive committee of the foundry and research committee. He has served as president of the Northern Illinois Foundrymen's Association.

♦ ♦ ♦

Donald C. Bakewell, vice president, Blaw-Knox Co., Pittsburgh, has been elected president, National Founders' Association. Mr. Bakewell became affiliated with the Blaw-Knox company early in 1937, being engaged in a sales capacity, and was elected a vice president in June, 1937, and a director in 1938. He was graduated from Yale in 1908 and took post graduate work at Massachusetts Institute of Technology. Prior to joining the Blaw-Knox company, Mr. Bakewell was for many years president, Duquesne Steel Foundry division, Continental Roll & Steel Foundry Co., Coraopolis, Pa. He has been active in the affairs of trade and technical associations of the foundry industry, serving as president, Steel Founders' Society of America, and as vice president of the N.F.A. He was awarded the Lorenz medal of the Steel Founders' society in 1941 for outstanding service to the steel castings industry.

♦ ♦ ♦

Thomas Kaveny Jr., vice president, Herman Pneumatic Machine Co., Pittsburgh, has been made chief, Foundry Equipment and Supplies section, Tools division, War Production Board, Washington, succeeding **W. R. Bean** who has been chief of the section for the past year. Mr. Kaveny has resigned as president of the Foundry Equipment Manufacturers Association. Mr. Bean has been made consultant, Foundry Equipment and Supplies section.

♦ ♦ ♦

Ralph W. Hisey, vice president in charge of the Machine Division, the Osborn Mfg. Co., Cleveland, has been elected president of the Foundry Equipment Manufacturers' Association, succeeding **Thomas Kaveny Jr.,** vice president, Herman Pneumatic Machine Co., Pittsburgh, who has resigned to become chief, Foundry Equipment and Supplies Section, Tools Division, War Production Board. Mr. Hisey was born in Milford, Ind., and attended public school at Canton, O. After working for the Russell Engine Co., Massillon, O., for 5 years as secretary to the secretary of the company, he joined the Osborn company as secretary to the chief engineer. Later he was made assistant works manager and has served as secretary and factory manager of the machine division.

♦ ♦ ♦

Stowell C. Wasson, general manager, National Malleable & Steel Castings Co., Indianapolis, has been elected a member of the board of directors of the Indianapolis Chamber of Commerce for a term of 5 years.

♦ ♦ ♦

Harry E. Orr has been appointed assistant to the vice president in charge of operation, Vanadium Corp. of America, New York. **Bert C. Brand** has been made comptroller, and **Lawrence C. Miller,** assistant treasurer.

♦ ♦ ♦

Thomas J. Mulvey has been appointed production manager of the General Electric Co.'s River Works, Lynn, Mass. Mr. Mulvey was born in Schenectady, N. Y. In June, 1906, the day after he was graduated from high school, he entered the employ of the General Electric Co. at its Schenectady plant as a clerk in the production department. Since March, 1935, he has been a member of the manufacturing general department at Schenectady on the staff of W. R. Burrows, vice president. In January, 1937, Mr. Mulvey was transferred to the Erie, Pa., plant as production manager, holding that position until his recent appointment.

♦ ♦ ♦

C. A. Babbitt has been appointed field engineer, the Norton Co., Worcester, Mass. Mr. Babbitt's territory will include New York city, Philadelphia and New Jersey, and he will make his headquarters at Philadelphia.

♦ ♦ ♦

John E. Neumann has been elected president, Anderson Stove Co. Inc., Anderson, Ind. **Wilbur J. Birkenmeier** and **Marion Collins** have been elected vice president and secretary-treasurer, respectively.

♦ ♦ ♦

Dean M. Warren, formerly in charge of technical publicity, General Electric Co., Nela Park, Cleveland, has been transferred to the Empire Division of the firm's lamp department, Buffalo. Mr. Warren will devote full time to wartime lighting of industries in the Buffalo area.

♦ ♦ ♦

Esse E. Routh has been elected vice president and director of sales, Mathieson Alkali Works Inc., New York, succeeding **John A. Kienle,** who retired recently. **Robert J. Quinn** has been appointed assistant to Mr. Routh and **D. W. Drummond** has been appointed general manager of sales.

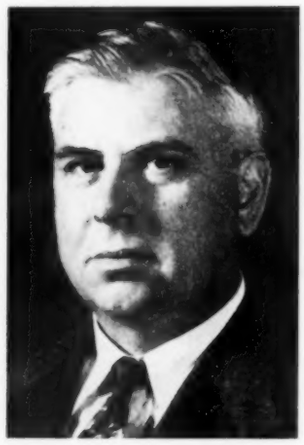
♦ ♦ ♦

George A. Lennox, assistant sales manager, Driver-Harris Co., Harrison, N. J., has been promoted to general sales manager. Mr. Lennox joined Driver-Harris in 1907, becoming Chicago district sales

(*Concluded on page* 92)

W. R. Bean

Thomas Kaveny Jr.



Ralph W. Hisey

Donald C. Bakewell

This Foundry Saves 2 Hours in Core-Baking Time

The average time for baking a rack of cores in this Midwestern steel foundry, with the binder they formerly used, was 4 hours. When they put Truline Binder* in the core room, baking time was cut to 2 hours.

Thus they almost doubled core-oven output without adding any new equipment. The actual net increase in daily core production, including all factors, was 79%.

Think what this can mean to you in delivering cores faster to the foundry floor. Aside from the many other advantages of Truline Binder, here is a way to be sure of *enough* cores which are thoroughly dry, with no green bottoms to cause unsound castings.

The only way to find out how Truline Binder can keep those cores rolling is to try it under your own conditions. We will be glad to supply you with a 50 lb. sample of Truline, so that you can find out for yourself. A service man is available to help you if you desire. Use the handy coupon below.

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..... (state type of work and kind of metal cast)

.....

Name _____ Title _____

Company _____ City _____ State _____

Address _____ JJ-58

TRULINE BINDER

(*Concluded from page* 90)

manager in 1917, and later assistant sales manager. **Joseph B. Shelby,** formerly manager of the foundry, succeeds Mr. Lennox as assistant sales manager. Mr. Shelby has been associated with the company since 1918.

♦ ♦ ♦

M. E. First, formerly chief engineer, has been appointed director of the foundry equipment department, C. O. Bartlett & Snow Co., Cleveland, and **Henry A. Christy** has been elected a member of the

M. E. First

board of directors. Mr. First is a director of the company and has served as chief engineer for the past 22 years. During that time he has been intimately identified with Bartlett-Snow foundry equipment practices and installations. Prior to joining the Bartlett-Snow Co., Mr. First was connected with American Steel Foundries Co., serving at both the Indiana Harbor, Ind., and Alliance, O., plants. Mr. Christy was graduated from the Case School of mechanical engineering. He joined the Bartlett and Snow company as production clerk a few days after his graduation and has risen steadily in the company, having been made assistant production manager in 1925, production manager in 1928 and superintendent in 1936.

♦ ♦ ♦

D. Wallace MacClay, OCD chief for Division No. 4, Chicago metropolitan area, has been appointed employment manager, Howard Foundry Co., Chicago. Harvey W. Johnson has been named employment welfare promotion manager, and George Wilson as head of the department of employment and personnel.

♦ ♦ ♦

Rene S. Durham, formerly foreman, Union Machine Co., Bartlesville, Okla., recently has become connected with the Western Foundry Co., Portland, Oreg. Mr. Durham began his foundry training as an apprentice in 1916 with the Union Machine Co. He served in every branch of foundry work while in the employ of that company and in 1934 was appointed foreman.

♦ ♦ ♦

George J. Taylor, industrial lighting engineer, General Electric Co., Nela Park, Cleveland, has been appointed to the post of wartime lighting engineer for the Atlantic division with headquarters at New York. In his new position, Mr. Taylor will work closely with the many government war production authorities recently transferred from Washington to the New York-Newark area.

♦ ♦ ♦

Alfred Kauffmann, president, Link-Belt Co., Chicago, has resigned due to ill health. **William C. Carter,** for 14 years vice president and for the past year executive vice president, has been elected president to succed Mr. Kauffman. Mr. Carter, a mechanical engineering graduate of the University of Illinois, joined the Link-Belt Co., Chicago, at the Pershing Road plant as a draftsman. He has served the organization as engineering department supervisor, construction superintendent, plant superintendent, plant general manager, and vice president in charge of production. Mr. Kauffman remains a member of the board of directors.

♦ ♦ ♦

L. J. Andrews, recently appointed superintendent Griffin Wheel Co., foundry Los Angeles, was born in Chicago and received technical and mechanical education at the Austin High School and Crane Technical College. After serving apprenticeship at the plant of the American Pattern & Model Co., he worked for a short time at the Chicago plant of the Griffin Wheel Co. Later he moved to California and in 1922 joined the Griffin Wheel Co., Los Angeles, as a patternmaker. Ten years later he was appointed assistant foreman

L. J. Andrews

in the machine shop and was advanced through different departments until he became general foreman in 1938. He was appointed plant superintendent Nov. 1 to succeed the late A. J. Troja.

♦ ♦ ♦

H. L. Harvill has organized the H. L. Harvill Co., Los Angeles, which will specialize in centrifugal, pressure and die castings, as well as permanent molds. Associated with Mr. Harvill are **R. C. Beck,** chief engineer; **Adolph Oswald,** permanent mold design; **S. I. Gleason,**

Henry A. Christy

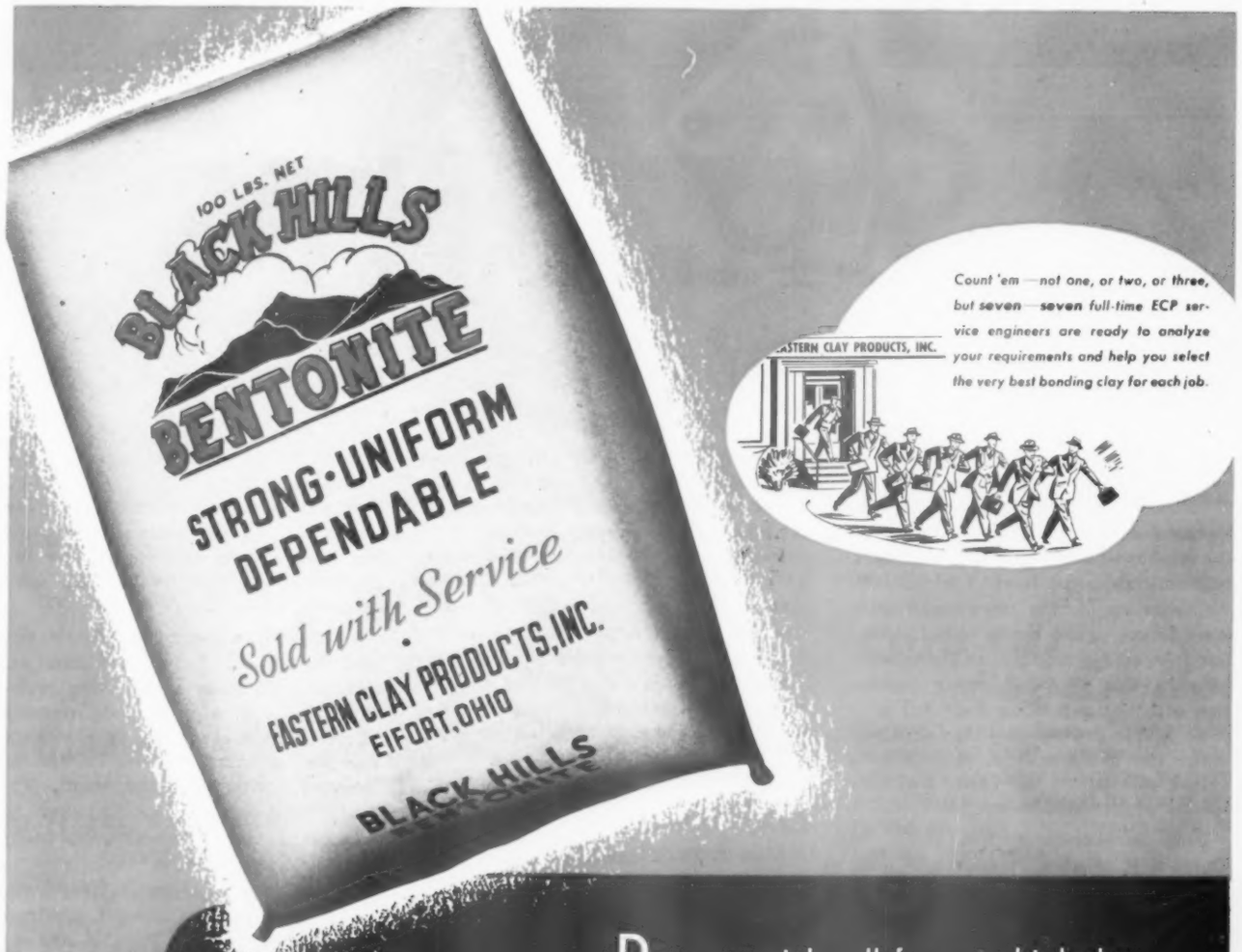
metallurgist; **Dale Norton,** casting foreman; **L. W. Johnson,** office manager and M. C. Goodfellow, purchasing agent.

♦ ♦ ♦

A. R. Abelt, secretary, Chain Belt Co., Milwaukee, was elected director, Baldwin Duckworth Division, Chain Belt Co., Springfield, Mass., to succeed the late **F. J. Weschler.** In addition to being made a director of the company Mr. Abelt also was elected a vice president. **G. D. Gilbert,** sales manager of Baldwin-Duckworth Division has been made general manager and also was elected secretary to succeed Mr. Abelt.

♦ ♦ ♦

Alvin A. Borgading, assistant to the purchasing agent, American Car & Foundry Co., New York, since 1939, recently has been appointed purchasing agent. **Herbert Streader** has been named assistant purchasing agent and placed in charge of the material control division set up under the War Production Board's controlled materials plan. **George W. Brown** continues as an assistant purchasing agent. Mr. Borgading has been associated with the company since 1907, when as a boy he began working in the St. Louis office. In 1918 he was transferred to New York, as buyer for the purchasing department, after serving in the first World War. In 1923 he was appointed chief clerk of the purchasing department.



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A Foundry Sand Service Based Upon Practical Research

A.F.A. ESTABLISHES RESEARCH FOUNDATION

A GREATLY expanded program for research and collateral projects of the American Foundrymen's Association is seen in the announcement of the establishment of a foundation which will seek an initial fund of $1,000,000. Authorization for the move stems from a resolution, passed by the A.F.A. board last July, calling attention to the demonstrated value of extra-regular association activities and citing the need of a more efficient plan than has obtained under the old system of making individual solicitations of funds for each special project undertaken.

This announcement was made by Duncan P. Forbes, president, Gunite Foundries Corp., and president of the Association.

Since adoption of the resolution preliminary investigation has been concluded of all aspects of the foundation plan and included a poll of representative opinion within the industry concerning the feasibility of a kind of "community chest" method for meeting the problem. The first two or three months of 1943 will be devoted to a continuation of this preparatory work, with active campaigning seen for early spring, according to the present schedule.

Income from the foundation will total an estimated $25,000 to $30,000, based upon present rates, and will be allocated annually to cover 5 year periods in order that continuing projects will be supported without interruption. A feature of the program, now being developed, is a system of matching grants whereby it is expected materially to increase the actual funds available each year by co-operating with related associations and interests.

Soon to be released are details concerning the scope of the foundation program, the method of selecting projects for development, and the general plan of supervision of the widespread operations now envisioned. It was said that their final development hinged upon still wider consultation with members of the industry, research institute and college authorities, and the administrators of foundations in related fields. Stressing that the foundation will not in any sense reduce the activity of the regularly instituted committees of the A.F.A., Mr. Forbes stated that, to the contrary, the foundation would materially enhance the total accomplishments of the organization in relation to its broad service to the industry.

The foundation board of trustees, defined by the A.F.A. board of directors, consists of the last seven living presidents of A.F.A. with the most recently retired president serving as chairman. The present board includes Herbert S. Simpson, chairman of the board, National Engineering Co., Chicago, as chairman; Lester N. Shannon, vice president, Stockham Pipe Fittings Co., Birmingham, Ala.; Henry S. Washburn, president, Plainville Casting Co., Plainville, Conn.; Marshall Post, vice president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; Hyman Bornstein, director of laboratories, Deere & Co., Moline, Ill.; James L. Wick Jr., president, Falcon Bronze Co., Youngstown, O.; and Dan M. Avey, Avey Products Co., Tulsa, Okla.

Sustaining Members Have New Emblem

The American Foundrymen's Association recently has developed a new emblem for its sustaining members. As shown in the accompanying illustration, the new emblem shows a photographic reproduction of the front of the A.F.A. gold medals, which are awarded annually for outstanding contributions to the advancement of the foundry industry. The emblem is approximately 10 inches square, and has the words "Sustaining Member" lettered at the bottom of the insignia. The new emblem already has been mailed to the sustaining members.

Due to the shortage of metals, it has been necessary for the A.F.A. to provide a new type of membership emblem for company and affiliate members since

the old supply is exhausted. These emblems, which will be sent only to new members as they join the A.F.A., is made by the same photographic process, with the design reproducing in black and gray the gold and black design on the metallic emblems previously supplied new members. The company membership emblem is 4 x 8 inches and the affiliate member emblem is 3 x 6 inches.

Motion Study Films Made Available

Bureau of Visual Instruction, Extension Division, State University of Iowa, Iowa City, Iowa, has made available on a loan basis, its library of time and motion study motion picture films which show examples of motion economy applications in various types of factory and office operations. An extension bulletin has been prepared which lists the films available and describes the operations which are illustrated by each film.

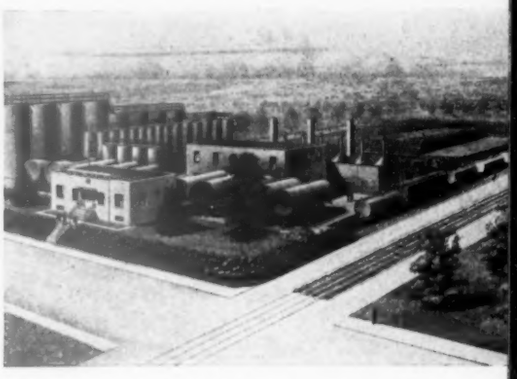
The CORE OIL DOCTOR

Devoted to new ideas and case study reports on core room practice

Published Monthly, Volume 2, Number 1, January 1943

A corner in our laboratory.

One of our pump and scale rooms.



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A SPECIAL CORE OIL *for* MAGNESIUM - ALUMINUM - BRONZE

- **Works very smoothly in the core boxes, and does not crust as quickly as other oils when mixed with sand during hot weather**
- **Will not stain coremakers' hands**
- **Dries quickly in the core oven**
- **Remarkably easy shake-out**
- **Minimum gas when metal is poured**
- **No burning in**
- **Creates no obnoxious odors**
- **Will produce cores of desired strength at less cost**
- **This special core oil for non-ferrous castings is produced in several grades to meet the particular conditions of any foundry**

Let us prove it — send for a free sample, naming the metals you pour, or order a trial drum. You will find that there is no better core oil at any price.

Core Oil Separation

Core oil, regardless of who manufactures it, may "separate" and—although such separation is a rare occurrence—it is well to know what to do so that your production will not be interrupted.

Separation means that the rosin in the formula has separated from the oil and can easily be discovered before it causes trouble because the rosin appears like heavy molasses, either dark or golden in color, and settles on the bottom of the tank or drum where the outlet usually is located.

If such a condition exists, immediately notify your supplier to replace the separated oil; and, if it is necessary to use some to continue core production, proceed as follows: Take an open-headed steel drum and pour into it *all* of the contents of the drum of separated core oil. Gradually heat until the contents show slight signs of boiling, and then immediately put out the fire. Stir the contents thoroughly and the core oil will be as good as ever and will not again separate. Part drums of core oil should be returned as only the full drums have the correct proportion of ingredients.

CERTIFIED CORE OILS WILL NOT SEPARATE, NO MATTER HOW LONG THEY REMAIN UNUSED.

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BY A. H. ALLEN
Detroit Editor,
The Foundry

INCREASING easiness in foundry business, noted here briefly last month, is becoming more widespread and is being accentuated by a leveling off in production of ordnance items, affecting both present and forward schedules. The latter development, coming on top of a slowing down in requirements for castings to be used in tooling and equipment, is convincing some foundry operators that the peak has been passed in demand for iron and steel castings, and that from here on out a more even rate of production can be expected, along with occasional intervals when complete cessation of certain types of production will develop.

There is no alarm over the change, because order books are still well filled. And it is not likely any serious layoffs of men will be encountered, since a reduction in overtime can take up any slack in demand before the necessity for layoffs.

Production Has Shifted

Slowing in ordnance is the result primarily of shifting production emphasis to airplanes and ships, giving right of way on materials to these products. Beyond this is the matter of gearing production to strategy, or what Maj. Gen. Levin H. Campbell, chief of ordnance, calls the "fluidity of war." For example, the pressure on heavy antiaircraft gun production at the moment has been almost completely released because of the shift in United Nations' tactics from defensive to offensive, and the virtual disappearance of German raids over Britain.

Prospects of large-scale invasions by the United Nations also changes requirements on trucks and related types of transport equipment. Thus several new types of amphibian trucks, jeeps, tractors and the like are being turned out in quantities, while requirements for standard types of army trucks have eased.

Tank schedules have been trimmed appreciably from earlier projections and the trend of output for the early months of 1943 should stay on a horizontal plane, with possibly a slight drop if anything. This is going to mean shutdowns, perhaps only temporary, in some of the major tank arsenals. At the same time, modifications in conventional tank designs for special offensive purposes have already been effected and there will be further moves of this type. An example is the M-5 weapon carrier—a standard medium tank hull and track mechanism, with the superstructure and turret removed to permit mounting a 105-millimeter howitzer and antiaircraft gun. This potent new weapon was credited by the British as being one of the principal aids in the routing of Rommel in the early stages of the Libyan offensive.

These shifts in war strategy and equipment are bound to have effect on foundry activity, even though only indirectly, since many of the component parts of ordnance are steel castings. The Ordnance Department has said that reductions now in prospect are going to be concentrated among the prime contractors and the government arsenals, so that the impact on smaller firms will not be so serious. It may be conceded from a morale standpoint that this is sound policy, but it is difficult to see how it can be accomplished, since the structure of American industry is based on large companies subcontracting varying proportions of their requirements to the smaller operators. If the contracts of the principal suppliers are trimmed, the subcontractors are going to be affected automatically, no matter how anxious the Ordnance Department may be to preserve backlogs.

Face Reduced Schedules

Since the Michigan area has undertaken to supply a major share of ordnance requirements, the effect of reduced schedules may be felt more there than in other sections of the country, but army officials point out that if idle capacity results, it may be possible to move in additional navy or aircraft work. The unfortunate part of this is that the navy by now has placed contracts for its needs. Not so long ago some Michigan plants were approached to take on navy work but at the time could be of no assistance because ordnance was then taking all their capacity. Meanwhile the navy had to make other arrangements, so if these plants can now take business the navy cannot offer much because the bulk of its requirements have been started elsewhere.

The feeling persists among gray iron foundrymen that they are not getting a fair shake in the war production program. Most of them could take on a considerable volume of casting work which they believe has not been forthcoming because of prejudice against gray iron among military authorities. Efforts to convince ordnance experts and others in Washington on the merits of gray cast iron for certain applications have not been very successful.

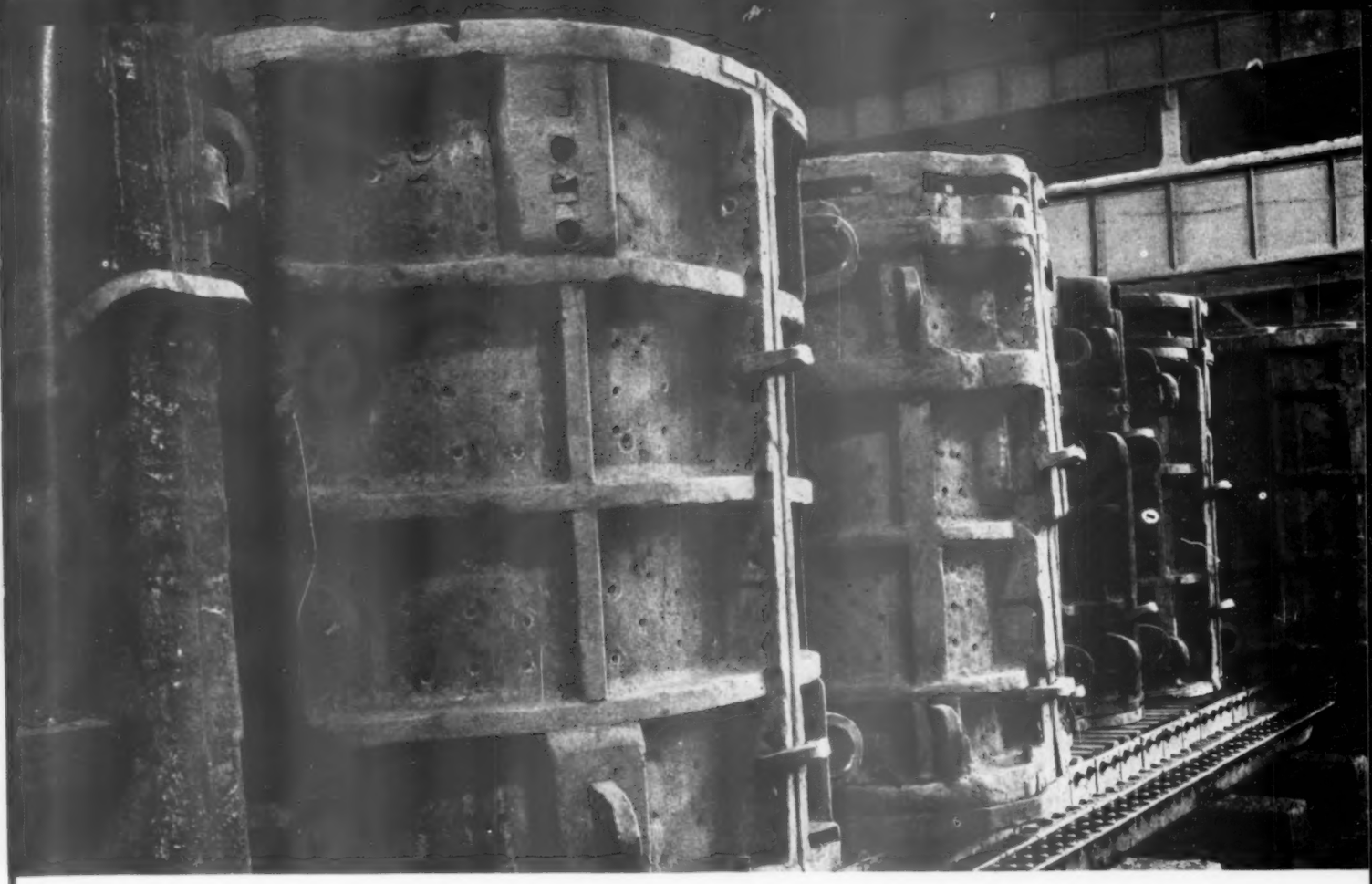
Production Moves Upward

There is no defeatism in the aluminum foundry field, particularly as regards airplane engine cylinder heads. Production moves upward steadily, with apparently no ceiling in sight. The possibility is seen of airplane engine horsepower soaring to the unbelievable height of 75,000,000 per month by the end of this year. Probably two-thirds of this will be radial-type engines nearly all of which use cast aluminum cylinder heads. Translating this horsepower into terms of engines and the latter into terms of airplanes gives a figure far beyond anything yet proposed for production. The answer of course lies in the matter of spares—both spare engines and spare parts for these engines. It is reported that some plane engines are giving only 40 hours of service on the North African front, because of the ravages of sand, so it may be necessary to base engine production two or three times the actual number of units needed for the planes which will be built.

A disturbing development in the aluminum cylinder head picture is the likelihood of the forged aluminum head replacing the cast part. A plant is now going up in Michigan to supply the forged head which is reported to give an additional 15 per cent power in radial engines because of its higher strength and resultant compression ratio.

The vice president of one of the leading engine building companies was asked about this trend and he replied that the forged head appears destined for much wider use in the immediate future. When asked what this would do to the numer-

(*Concluded on page* 99)



SPEEDING AMERICA'S PRODUCTION

The success of the Allied war effort depends greatly upon the speed of our production — the output of coils and sheets, castings and forgings, bars and shapes — and thousands of other vital materials. American Industry has already come through in a way that spells disaster for the Axis nations, and it's only the beginning.

Mathews Engineers are spending long hours in solving the many conveying problems which go along with this great production program. You can get Mathews engineering service and Mathews Conveyers with much less delay than you might think. By furnishing the highest preference rating you can possibly obtain, along with complete information regarding your problem, much time can be saved in obtaining the conveying equipment you require. Our job is to serve you in the most efficient manner possible.

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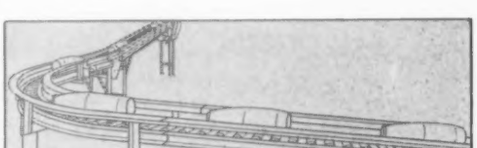
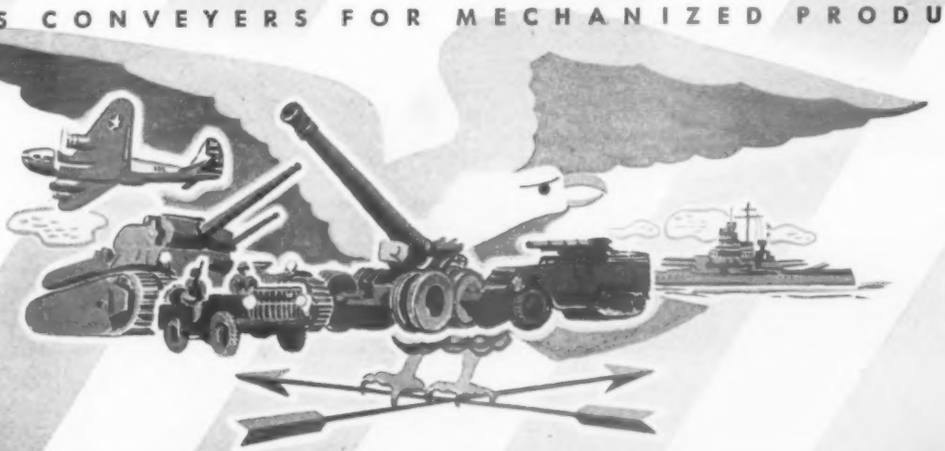


If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer

MATHEWS CONVEYERS FOR MECHANIZED PRODUCTION



Silent Night!?

IS 24 HR. OPERATION OF COMPRESSORS, DIESELS, ETC., CAUSING COMPLAINTS ?????

Model DS

Are people near your plant complaining of noise at night? If so, and the noise is from the air intake on Diesels, compressors, etc., here's the solution:

PROTECTOMOTOR SILENCER-FILTER FOR DIESEL ENGINE INTAKE

The Model DS Silencer-filter hushes the most raucous air intake—plus preventing the entry of abrasive foreign matter. It's a double duty filter—helping to prevent complaints due to night operation, saving excess wear on engines and compressors due to intake of abrasive dust. More than 750,000 Protectomotors of similar construction have been sold since 1920. Quickly and easily installed, the Model DS provides capacities and threaded or flanged connections for any engine or compressor.

MODEL DS CONSTRUCTION FEATURES

A. Series of cylindrical rectifying chambers of scientific diameter to length ratio which smooths out sound waves.

B. Dry Feltex Filtering Medium 99.8% efficient by University of California Laboratory tests.

C. Radial Fin Construction. Permits large area of filtering medium to occupy smallest possible space.

D. Rigid, galvanized mesh frame.

E. Reinforcing tube. The Model DS Protectomotor is "built like a battleship."

Always Reduces Engine Wear — May Prevent a "Nuisance Action"

NEW CATALOG

44 pages, completely illustrates and describes filters for ventilation and pipe lines as well as engine intake . . . . .

STAYNEW FILTER CORP.
36 Centre Park, Rochester, N. Y.
"Air Filter Headquarters"

PROTECTOMOTOR
99 9/10 Per Cent EFFICIENT
AIR FILTERS

(*Concluded from page* 96)

ous large aluminum foundries now turning out cast heads by the thousands daily, he said "they would have to be converted to forge shops." The neat little problem of converting an aluminum foundry to a forge shop is something for the production planners to fool around with. About all they could rescue from the aluminum foundry would be the four walls and the roof.

It is only in recent months that the cast aluminum head has gone into mass production in the real sense of the word, and the natural expectation is that many improvements will be made in production technique as volume continues to mount. One of the first problems, now reported well on the way toward solution, is that of spotting the 500 or 600 support wires in the mold to support the thin wedges of sand forming the fins on the head. These wires must be set in position by hand, and while some coremakers have become so expert that they can set 8 or 10 wires at a time, it remains a tedious job.

Dozens of suggestions have been made for gadgets to relieve the time-consuming job of setting these wires, but the more direct approach to the problem is to alter the character of the sand and the mixture used so that the fins can be formed strong enough to stand up without the wire supports. It is understood such a mixture has been developed and probably will find acceptance shortly.

Chrysler Corp. will operate two large foundries—aluminum and magnesium, presumably—in connection with the huge Dodge-Chicago aircraft engine plant which is being rushed to completion. There are about 17,000 construction workmen now on the job, and 1200 Chrysler production, engineering, purchasing and manufacturing personnel now have occupied the office section of the plant. W. E. Jominy, recently transferred from General Motors Research to Chrysler, and well known for his part in development of the Jominy hardenability test for steel, is understood to have charge of foundry operations at Dodge-Chicago.

Grede Buys Smith Steel Foundry

Plant and equipment of the Smith Steel Foundry Co., 1320 South First street, Milwaukee, have been purchased by Grede Foundries, Inc., and will continue without interruption the production of steel castings for war work. The foundry has been operating at maximum production with approximately 350 employes working on two shifts.

Fred V. Gardner, president of Smith Steel Foundry Co. since the departure for military service of Edward A. Bacon, will return to full time management of his business engineering company, Fred V. Gardner Associates. Wm. J. Grede, president, Grede Foundries Inc., has indicated that otherwise Smith's present personnel will continue to be employed.

Grede Foundries, Inc., now operates two gray iron foundries, the Liberty Foundry Division, Wauwatosa; and the Spring City Foundry Division in Waukesha; as well as another steel foundry, the Milwaukee Foundry Division in Milwaukee. The acquisition of the Smith foundry will approximately double its capacity for the production of steel castings. Direct supervision of the operations at the newly acquired unit, which will be known as the Smith Steel Foundry Division, will be under J. J. Ewens, present works manager of the Milwaukee Steel Foundry Division. John W. Perry Jr., vice president and sales manager, Grede Foundries, Inc., also will have charge of sales of the Smith Steel Foundry Division.

To Hold Apprentice Training Contest

Apprentice training committee of the American Foundrymen's Association recently announced that it will continue the annual apprentice molding and patternmaking competition in 1943. The next contest, to be held in connection with the convention of the association scheduled for St. Louis, April 28, 29 and 30, is open to all indentured apprentices. Contests will be held in four classes, namely, gray iron molding, steel molding, nonferrous molding and patternmaking. The first, second and third prizes of $30, $20 and $10, respectively, in each of the four groups will be awarded to the winning entries if submitted from local competitions. Local competitions may be held by either individual foundries or pattern shops or by a group of foundries or local foundry association or chapter of the A. F. A.

This competition, first started in 1924, has become an outstanding event in the foundry field. Last year apprentices from some 60 or more of the best known industrial plants of the country participated.

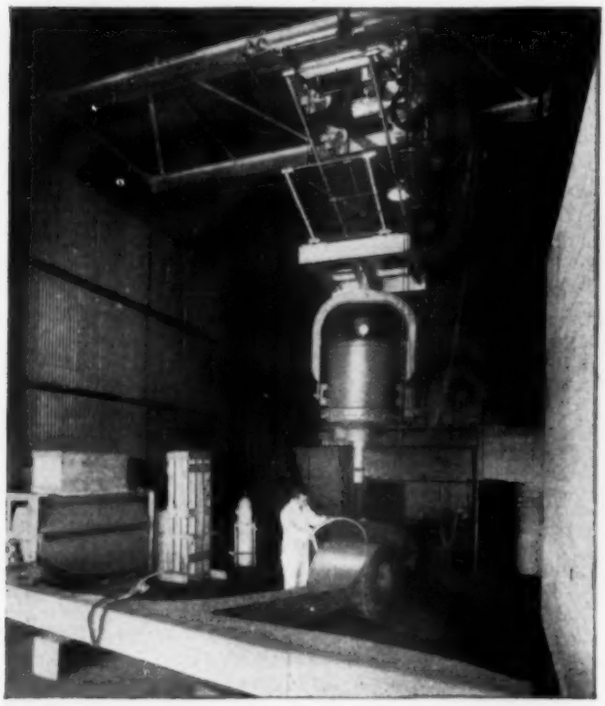
The committee supervising the contest are all men who have been instrumental in promoting a great deal of interest in organized apprentice training in foundries. Membership in the committee is as follows: Chairman, C. W. Wade, Caterpillar Tractor Co., Peoria, Ill.; Frank C. Cech, Cleveland Trade School, Cleveland; H. L. Charlson, American Steel Foundries, East Chicago, Ind.; J. Morgan Johnson, Tri-City Manufacturers' Association, Moline, Ill.; James G. Goldie, Cleveland Trade School, Cleveland; G. A. Zabel, Universal Foundry Co., Oshkosh, Wis.; E. P. Meyer, Chain Belt Co., Milwaukee.

The contest committee has arranged for distribution of copies of the regulations together with blueprints and patterns for the contest. Address the American Foundrymen's Association, 222 West Adams street, Chicago.

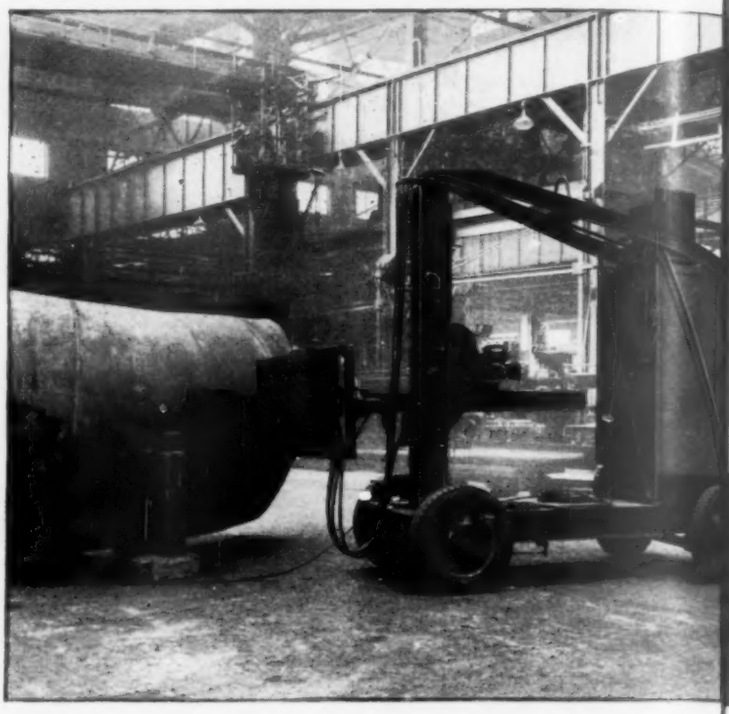
Pattern Shop Employes Win Award

Pattern shop of Caterpillar Tractor Co., Peoria, Ill., recently was presented with a 100 *per cent pennant in recognition of the fact that all of the employes of that department participate in the company's payroll deduction plan and contribute* 10 *per cent or more to the purchase of war bonds. Herman Walker (right) Treasury Department, is presenting the award to Elmer M. Wycoff (left) who is contributing the largest percentage of salary and Leonard Feldman, a member of the Caterpillar labor-management committee*

POWER—G-E Industrial X-Ray Units are available in a full range of power up to and including one-million volts. There's a G-E unit with a capacity to meet every need.



FULL FLEXIBILITY is built into every G-E X-Ray Unit to save valuable operating time and to facilitate accurate positioning for all types of industrial x-ray inspection.



INSPECTION PROBLEMS?

★ If you need x-ray apparatus in your inspection facilities, here's a sound suggestion for a full solution of your problem:

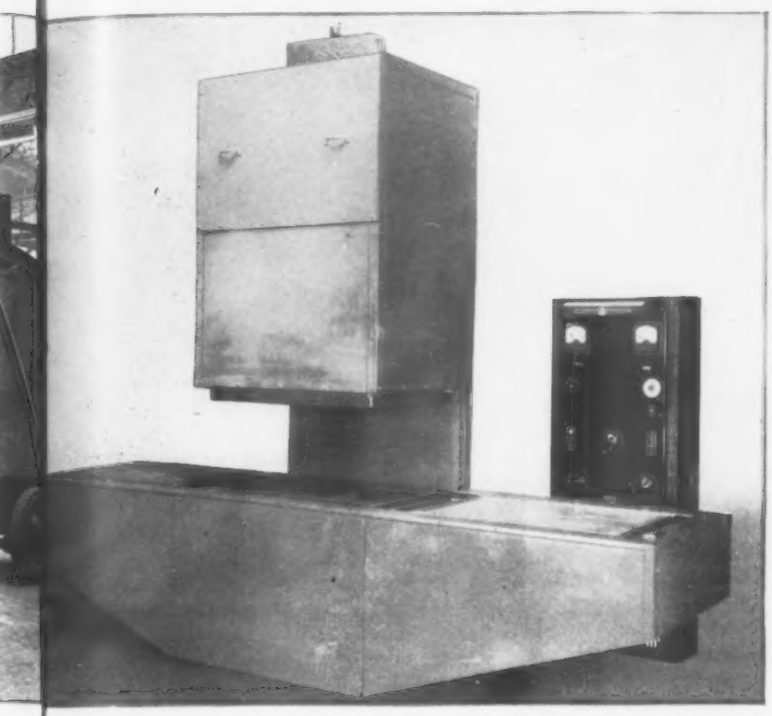
Take advantage of the services of G-E Industrial X-Ray Engineers. They will help you select exactly the right type of G-E equipment to enable you to enjoy fully all of the benefits of x-ray inspection.

You can rely on the recommendations of G-E X-Ray engineers. There will be no guesswork about them because they will be based on the cumulative knowledge gained in more than 20 years' experience in applying x-ray to the inspection problems of more than 500 of the world's leading industrial plants.

STANDARD UNIT DESIGNS are available in four basic types: Stationary Jib Crane, manual or motor-operated jib travel; Mobile Jib Crane; Mobile Units; Overhead Bridge Crane.

Today's Best Buy — U. S. War Bonds

AUTOMATIC UNIT provides rapid, accurate production-line x-ray examination of castings or metal assemblies. Operators load and unload cassettes; machine does the rest.



BEARING JIG—a new, fast, cost-cutting method for multiple x-ray examination of cylindrical bearings for air-craft, automotive, and Diesel engines.

G-E X-Ray Will Help You Solve 'Em

Shown here are several of the various types available in the complete line of G-E Industrial X-Ray Units. Fast, shockproof, easy-to-operate, they are all designed for heavy-duty industrial service, and you can depend on them to do your job better, faster, and more economically per-unit-inspected.

You can save time, insure production, and protect your x-ray investment by investigating G-E Industrial X-Ray Units. For full information, talk with G-E Industrial X-Ray Engineers at our Metal Show exhibit, or write or wire to General Electric X-Ray Corporation, 2012 Jackson Blvd., Chicago, Illinois. Address Department N31.

NEW, compact, self-contained G-E Industrial Photo-Radiograph Unit inspects small castings for major defects at one-eighth the cost of direct x-ray inspection.

GENERAL ELECTRIC X-RAY CORPORATION

2012 JACKSON BOULEVARD CHICAGO, ILLINOIS

the adventures of Bill

BY PAT DWYER
Drawings By RICHEY

SOME day when I have the time and the inclination, two factors which as you probably have noticed do not always synchronize or co-ordinate properly, I shall take what Bill calls a gander down among the tap roots and footnotes in a good, big, fat dictionary. On the comparatively few occasions I have skirted the fringes of this jungle I have stumbled over some curious roots of words that bear little or no resemblance to the original seed, and even less to the plants as we know them today.

I had the time the other night, also the inclination and fully intended to get right on the job immediately after a pipe or maybe two. Throwing a casual eye around the room I was mildly astonished to find that the book had vanished. Clearly this was a bit of something worth looking into. Books, especially large bulky tomes, do not take wings to themselves and fly away. Raising an imaginary bugle to my lips I blew a quavery imitation of the mess call, the only call I know to bring the entire garrison running.

Fixing each one in turn with the aloof and judicial eye I said that things had come to a pretty pass indeed when a book could disappear mysteriously the instant a man laid it down. A diligent and devoted young follower of Ellery Queen pressed me for further detail. Where had I seen it, when had I seen it, when had I laid it down, what kind of a book was it and had I looked for finger prints, foot prints, an illusive odor or a trap door in the floor?

Taking the more or less irrelevant questions in proper order I said I had seen it on the small table in the corner of the room. I had seen it regularly for years. Never mind when had I laid it down. The book was the dictionary. I had not looked for finger prints, foot prints or a trap door in the floor, but now that the point had been raised, I seemed to detect more than a slight odor of a small animal usually given three spaces horizontal or vertical in the more difficult cross word puzzles.

"Oh!" says the amateur E. Q. in a disappointed tone. "You mean the old disreputable dictionary. What a holy fuss about nothing." The remainder of the garrison smiled in indulgent approval and faded from the scene.

"If you can do it without stripping the gears," said this young sometime thorn in the side, "throw your mind back to the week before Christmas. Where were you at 3 p.m. on Sunday, Dec. 20?"

"That is an easy one. I was in the dog house and broke."

"You were up in the attic trying to rig an illuminated star in the high window. Instead of using a step ladder like any duly qualified light fixer you stood on an old dilapidated chair with only three legs and a crick in the back. Looks like something that came out of the Ark. Your little short bandy legs—asking your pardon, Papah—did not lift you high enough. So, what did you do? You came down here, lifted the dictionary from the table, lugged it up to the attic and placed it on the chair. When the job was done you stumbled down stairs minus the book and fell asleep on the lounge and snored like a compound, articulated, Mallet doukabour locomotive climbing over the high Sierras."

Clearly a quick and definite flank movement was required to rescue the horse, foot and artillery from this unfortunate spot in the battle line.

He is always short at Christmas

"So ho, me proud beauty," I said. "And how long have you been sitting on the right hand seat in the cab of a doukabour, handling the throttle and the johnson bar? From random remarks dropped here and there while accompanying me on occasional train trips I gathered the general impression that you did not know whether the locomotive was actuated by gas, electricity, hot water, hot air, steam or by a spring which some person, probably the driver, wound up at the station or in the round house. In fact, on one occasion when I had wasted half an hour trying to explain how a locomotive functions, you yawned politely and said, 'Who cares what makes the thing go, so long as it stays on the track and drags us to our destination like Mary's little lamb, or little Bo-Peep or whoever it was had the silly sheep dragging their tails behind them? Where else would one expect 'em to drag 'em?' "

"Percy told me all about it."

"Percy, hey? And pray may I ask, who is Percy?"

"He is one of my soldier boy correspondents. He wrote me the cutest letter all about a trip to the west coast and all about the big locomotive and everything, and I remember it all."

" 'Pon my word," I said. " 'Tis nothing less than one of the seven wonders of the world. Here I have been talking to you for 20 years, handing out sage words of wisdom and advice and—er—so forth on every conceivable topic under the sun. Apparently they have gone in one dainty ear and out through the other. Then along comes a lad you never saw, and probably never will see. He fills in an idle hour writing you a letter and to fill in the spaces where his imagination fails, he describes the performance of the locomotive which dragged his train in serpentine curves over the mountains. And you remember every word of it! I give up. Assuming that he is in the same age group as the other young heroes who have gone over the mountains, he probably was no further advanced than second assistant oiler in a round-house at the time he joined the colors and my hat is off to him and may God be with him wherever he goes. However, in civil life he was

(*Continued on page* 104)

Unloads and weighs steel to storage in half former time.

Stacks frames twice as high with six less hands.

HALF THE HOURS SAVED

AMERICAN MONORAIL

PUTS *Hands* TO BEST ADVANTAGE

From raw materials to finished products, in every handling operation, American MonoRail Equipment is putting hands to best advantage. (Both clock hands and workman's hands). Lifting, carrying, loading and unloading are done in less time and with less man power, skilled workmen are thereby made available for more production work. American MonoRail Equipment reduces accidents, reduces fatigue, increases efficiency, keeps materials on scheduled routes and results in savings of money as well as time.

American MonoRail Equipment is supplied for manual, electric or automatic operation. Let an American MonoRail Engineer tell you the whole story. Write today, no obligation.

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SIX LESS HANDS NEEDED

WRITE for Blue Book illustrating hundreds of MonoRail installations.

A consultation with an American MonoRail engineer may reveal hidden possibilities for handling savings.

THREE HOURS SAVED

ONLY TWO HANDS USED

Dries and packs finished parts with two hands.

Stores to greater capacity in a third less time.

(*Continued from page* 102)

an amateur and yet you take his description of a locomotive in preference to that of an experienced citizen, the present speaker no less, who at one time in a more or less varied career, worked in the very nest where the contraptions are built."

"I never heard of that chapter of your life. The only job I ever knew you to have is the one you have now."

"'Tis a common delusion of young people, my dear, to think that the world began on or about their birthday. In happy ignorance, behind rose-colored spectacles, they cannot or will not see that their parents had been battling the world, the flesh and the devil, with occasional success, for periods ranging from 20 to 50 years before little Snookums was ushered into the family circle."

"Gee, Pater," she exclaimed in admiration, "I never thought of that before. Tell me about the time you were a king in Babylon—or was it Ireland?—and you had a beautiful maiden"—taking a sly look in the mirror—"for a Christian slave."

With the conversation neatly turned into safer and more congenial channels, I called up the mental reserves to do a bit of plain and fancy biographical sketching. I never had a chance. To quote from many of our popular writers, "There was a knock came to the door." Except where that statement is used in burlesque or ridicule, it finishes the story so far as I am concerned. In this instance the knock at the door finished my story. My potential audience vanished after a quick glance through the glass door, a kiss from the tips of her fingers and a hasty warning.

"Brace yourself, Paw," she said, "here comes Bill, your old boon companion of the open road. In about two minutes by the clock he will be telling you how he cast the columns for Solomon's Temple, the Giant's Causeway, the front porch of Tara Hall and the Hanging Gardens of Babylon!"

Bill came in accompanied by a blast of wind and snow that would have given the late Mr. Longfellew some real inspiration had he the opportunity of rewriting several of the more stirring lines in *The Wreck of the Hesperus*. I asked him politely if he was in training for a dash to the north pole, or was he rambling around like a lost soul because he had not sense enough to stay home where, presumably, he was warm, well fed and comfortable.

"Well," said Bill, "I'll tell you. The warm and well-fed stuff is all right, but the comfort flies out through the window when one of the younger members opens up the radio on a program that would sour the milk of human kindness in a graven image. I decided if I had to be tortured to death, I would choose my own method of crossing the bar. So, like that young monk from Siberia you were telling me about one time, I broke out of my cell with a—well—with quite a bit of a yell, and so forth."

I admitted that these noble sentiments had my unqualified and wholehearted approval, even if I did not have the courage to adopt his heroic form of protest. However, in strict justice, I pointed out that some radio programs are a source of great pleasure to me. The singers can sing. The speakers can speak, and some of the comedy lads can make me laugh without creeping around in the gutters of uncouth noises, mispronounced words and the most grossly illiterate language. Unfortunately, these artists are overwhelmingly outnumbered by yawpered and mousie-voiced counterfeits, by speakers who have nothing to say and insist on saying it, by smarty comedians who retail old moldy chestnuts in the 'dis dat dese and dose,' 'he didn't have none,' and 'sure I seen him' vocabulary.

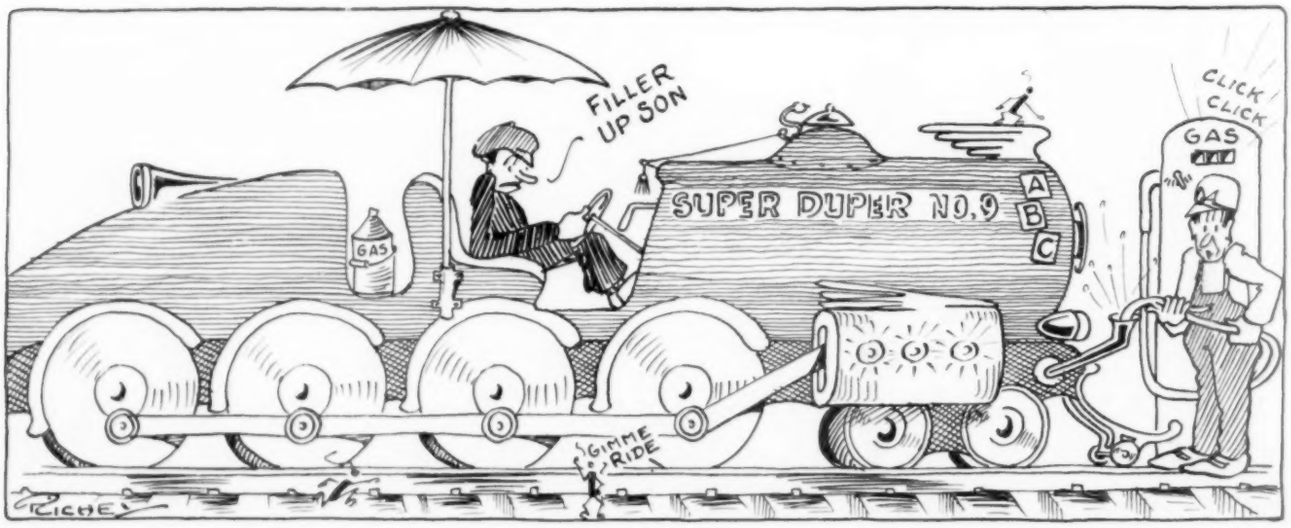
"Fair enough," Bill said, "so far as you go, but you don't go far enough. You have omitted the main guy, old Chief Pain-In-The-Neck himself. The plugger who breaks into every program at five-minute intervals to assure one and all, ever so earnestly, that if they wish to escape all kinds of horrible diseases in this life and even worse in the next, they should rush immediately to the nearest drug store or grocery store and get a bottle or package of Squoggum, spelled S-q-u-o-g-g-u-m."

"The point," I said, "raised by my honorable friend has its merits and is exceedingly well taken. You will be pleased to learn that I am an enthusiastic and charter member of an association recently organized by a widely read magazine to protest against this blatant menace to the peace and security of the home."

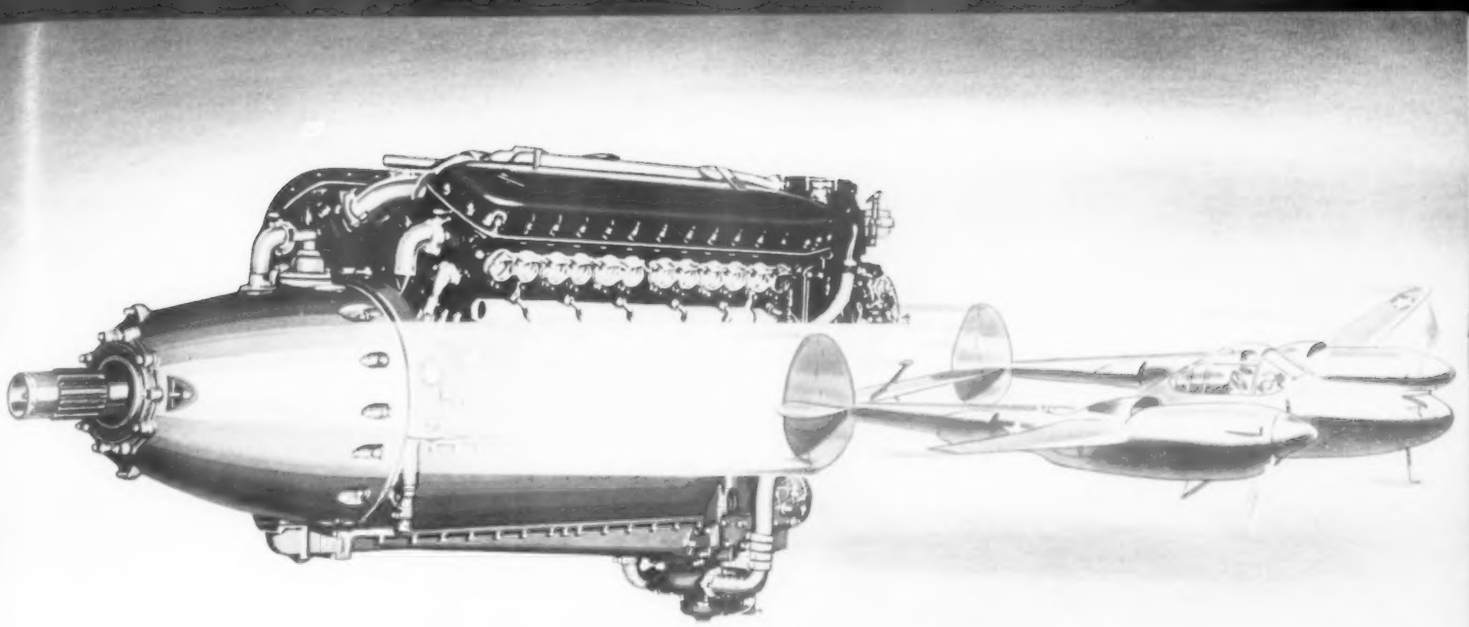
"Me, too," the honest fellow exclaimed in genuine admiration. "Let us consider for a moment a more congenial subject. I had a letter recently from a brass foundryman in which he wrote that he was making brass castings ⅛-inch thick and 6 inches in diameter with two patterns in a mold. He had gated these several ways, but the loss from cold shuts or misruns amounted to 25 per cent. The metal is a mixture of red and yellow brass scrap and leaves the furnace at a temperature of 2100 degrees Fahr. Here is a copy of what I wrote him. Listen:

"The metal mixture and pouring temperature are satisfactory. Apparently the cause of the trouble lies elsewhere.

(*Concluded on page* 134)



If he had a pair of wings he could fly through the air with the greatest of ease



OSBORN HARNESSES HORSES IN *Allison's* POWERHOUSE

DRIVING that incredible combination of speed, fire-power, high altitude and long range known officially as the P-38, are a pair of sleek, liquid-cooled Allison engines. Between them these power plants can turn up well over 2000 horsepower, and maintain that output for hours at a time.

Confining such power, holding and directing it so it can be transformed into useful work is one of the jobs of the Allison's many precision-moulded aluminum and magnesium castings. It is a matter of pride and of sober responsibility to Osborn that virtually every major casting in the Allison engine is moulded on Osborn moulding machines.

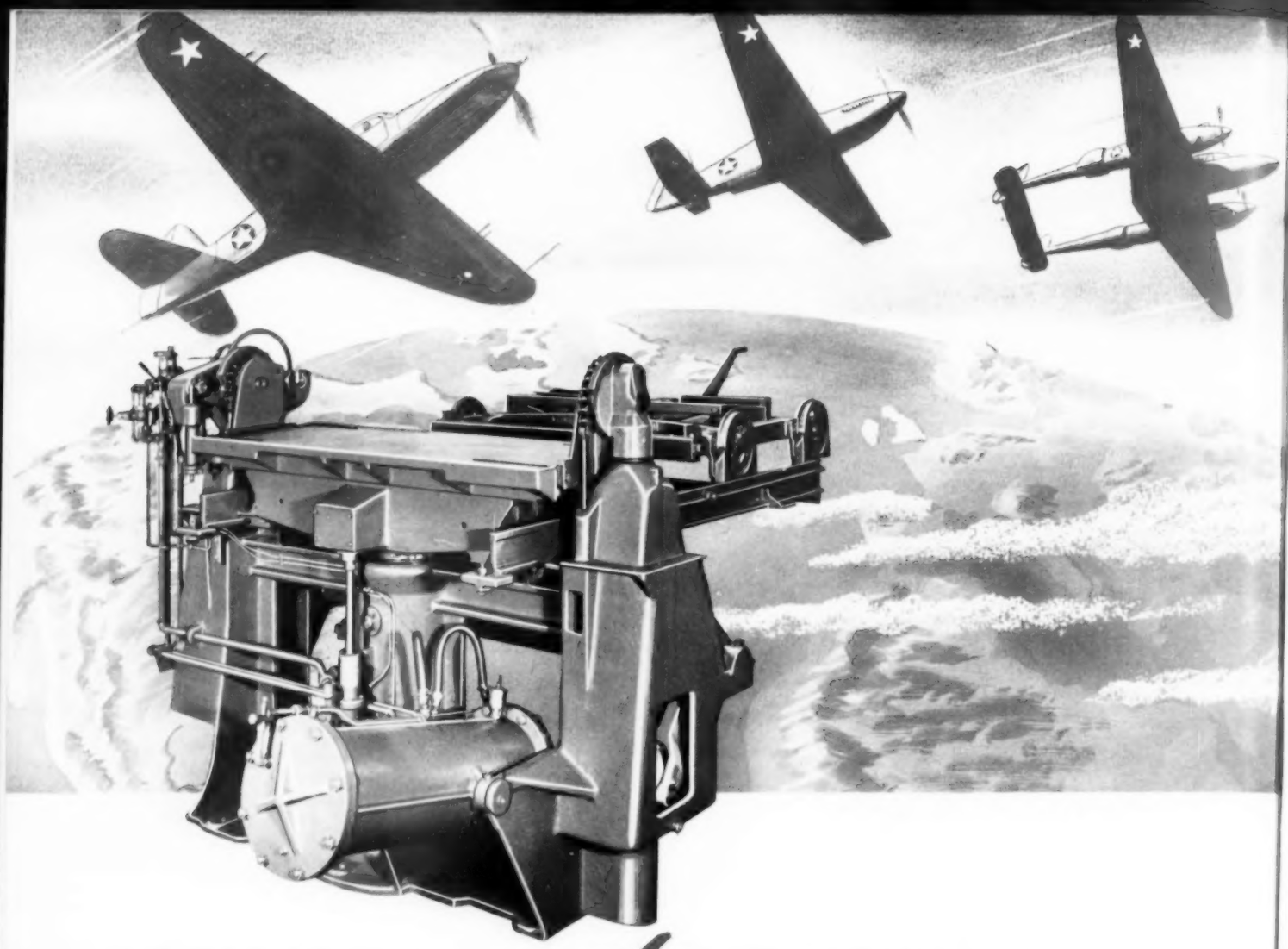
Precision and Production—Volume production of moulds for Allison cylinder heads, blocks and numerous other vital parts is achieved with the Osborn No. 405-79 moulding machine described on the following page.

THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue *Cleveland, Ohio*

OSBORN

MOULDING MACHINES



PRECISION *and* PRODUCTION

HERE is the Osborn No. 405-79 moulding machine, especially designed and engineered for quantity production of accurate, close-tolerance moulds and used for production of the famous Allison engine's major castings.

A Jolt-Rollover-Draw machine combining heavier, rugged design with precision manufacture, the Osborn No. 405-79 performs with the smoothness, ease and extreme accuracy essential to the production of America's superior tools of Victory.

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OSBORN

MOULDING MACHINES

STEEL castings production continued to decline in October, according to the Department of Commerce, total output being lowest since June 1941. Total production for October was 117,020 tons compared with 135,823 tons in September and a peak production of 149,625 tons in April. A slight increase was noted in the production of railway specialties where the total was 13,732 tons compared with 12,051 tons in September and a high point of 49,891 tons in October, 1941. With Washington at last realizing the importance of keeping railroad equipment in repair, it would seem likely that production of railroad specialties should increase further in the near future. Production of miscellaneous castings dropped from 123,772 tons in September to 103,288 tons in October. The Department of Commerce figures for malleable iron indicate a production of 64,719 tons in October compared with 58,687 tons in September and 84,296 tons in October, 1941. Many plants producing malleable iron have the facilities for handling considerably more work but find that the matter of substitution still has not been pushed as far as might seem possible.

—□—

The United States Civil Service Commission is conducting a nation wide search for production specialists to administer the new Controlled Materials Plan of the War Production Board. At present the commission is seeking persons with industrial or engineering experience in the fields of copper, aluminum, carbon steel and alloy steel. The commission's announcement No. 279, concerning the jobs open, may be obtained from local representatives at first and second class post offices, or from the United States Civil Service Commission, Washington.

—□—

The Die-Casting Industry Advisory Committee recently has approved a plan for the WPB to certify to the Army and Navy the names of WPB-inspected producers supplying special quality, x-ray tested, zinc and aluminum die castings for use in producing ammunition and other combat items. The committee approved a "superior specification" for special quality aluminum die castings made by certified producers. The specification calls for x-ray examination of the entire run of sample castings and of a specified number of random samples taken from the production run. Sample castings will also be subjected to breakdown tests.

—□—

Speaking of the substitution of malleable iron castings, foundrymen should be interested in an article "Malleable Iron Finds Wartime Needs" by Colin Carmichael, which appears in the December issue of *Machine Design*, starting on page 96. Mr. Carmichael gives the following important suggestion to designers: "Because foundry engineers are familiar with their own production methods, they often can suggest small changes in design which may greatly accelerate production, cut weight and cost, and improve the accuracy and soundness of castings. It therefore behooves the designer to take advantage of the accumulated experience of the foundries and work in close co-operation with them."

—□—

A sticker "For Defense, Please Rush, Thank You—Vapor Blast Mfg. Co." recently has been prepared by that organization. It is claimed that the sticker does expedite deliveries.

—□—

From July 31, 1937, when silicosis claims became compensable in Ohio, up to Oct. 31, 1942, there were 1104 such claims filed in that state. Of the total, 467 claims have been allowed, 494 disallowed and 134 still are pending. Of the claims allowed, 254 or 54.4 per cent originated in foundries, 154 or 33.0 per cent in ceramic plants, 31 or 6.6 per cent cut stone, 11 or 2.4 per cent in polishing, buffing and grinding, 3 or 0.6 per cent in coal mines and 14 or 3.0 per cent in miscellaneous industries. The claims originating in foundries were divided as follows: Iron 133, steel 69 and nonferrous 52.

—□—

Additional control over the purchase of laboratory equipment recently was put into effect by the issuance of limitation order L-144 by the WPB. The amended order provides that no purchaser of laboratory equipment shall be permitted to acquire an item valued at more than $50 or any quantity of the same item to value of more than $50 without securing an authorization for such purchase on form PD-620. Purchases authorized on that basis will be assigned an AA-4 rating.

—□—

Norton Co., Worcester, Mass., recently has made available "Lessons in Grinding", a series of four motion picture films. These may be secured by industrial apprentice schools, Army and Navy training schools, colleges, universities, vocational schools and other classes where machine shop practice is being taught. These films present the fundamentals of grinding in a way in which an inexperienced man can grasp the details. The films are loaned without charge.

—□—

Resignation of W. R. Bean as Chief, Foundry Equipment and Supplies Section, Tools Division, War Production Board, Washington, is announced elsewhere in this issue. Mr. Bean has occupied that position for slightly over a year, and during that most difficult period has rendered tremendous service to the war effort by assisting equipment and supply manufacturers in meeting the war demands of the American foundry industry. He has been one of the hardest working, most sincere men in that branch of the government service, and his extensive background of experience in the manufacture of both castings and foundry equipment has been utilized to the fullest extent in solving the problems of war production. The entire foundry industry as well as the manufacturers of foundry equipment and supplies have been indeed fortunate in having the guidance and help of Mr. Bean in those hectic days since Pearl Harbor.

—□—

Best wishes for the New Year, and in the months ahead, may each one of us do our part in the all-out drive for a United Nations victory in 1943.

F.G.S.

Foundry Developments at short range

FURTHER investigation of a copper-antimony-nickel alloy developed by a Canadian firm for cast gears, which was mentioned previously in this department, indicates that best results are obtained with an antimony content between 7 and 8 per cent, and a nickel content between 1½ and 2½ per cent. It may be sand-cast or chill-cast, but chill-casting does not give any improvement. The alloy never has pitted or spalled in tests and when it fails it is by simple abrasive wear of the surface. It is claimed that double the rated full catalog load—about 45 per cent of breakdown load—can be applied immediately to a new gear without causing prompt destruction. Worm gears of the alloy will carry about 25 per cent more load than a tin bronze or will run 15 degrees Fahr. cooler at the same load. Average physical properties are 31,900 pounds per square inch tensile strength; 19,000 pounds per square inch yield strength; 7½ per cent elongation in 2 inches, and 15 per cent reduction in area.

♦ ♦ ♦

Shielding of the electric arc with a blanket of inert helium gas which prevents oxidation of molten weld metal is a new development for restoring to usefulness magnesium metal and alloys which contain small defects. The process developed jointly by Dow Chemical Co. and Northrup Aircraft Inc., is of particular interest in reclaiming vital sand-cast, aircraft castings discarded due to inability to meet certain specifications. The process also is being employed to join magnesium parts instead of riveting, etc.

♦ ♦ ♦

While many operators of pit-type, coke fired brass melting furnaces believe that the air supply should enter through the firebars, that procedure is not good practice. Purpose of the coke on top of the firebars is primarily to support the crucible. Coke surrounding the crucible provides the heat for melting, and the air should be supplied through a 2-inch gap or port between the firebars and the bottom of the lining. The firebars should be spaced closely so that the bulk of the air enters through the port and confines the main combustion to the sides of the crucible where it is wanted, and prevents the coke bed from burning away too rapidly.

♦ ♦ ♦

According to the *Tentatively Recommended Practices for Sand-cast Tin Bronzes* prepared by the Nonferrous Division of the A.F.A., molding sand for those alloys of about A.F.A. No. 2 grain size and D to F clay content is suggested since the castings must be smooth and clean. The sand must have sufficient bond strength so that it will not result in scabs, and will lift well. More specifically the following range of properties of the sands to be used are suggested: Grain size A.F.A. 140 to 180; clay content A.F.A. 5 to 20 per cent; permeability 10 to 25; green compressive strength 7 to 9 pounds per square inch, and moisture 5 to 6 per cent.

♦ ♦ ♦

A new type of asphalt tile designed to prevent accumulation of static electricity is said to be non-slip, non-dusting, non-sparking, moisture-resistant, and odorless. It is black in color and is made in ⅛, 3/16, ¼, and ⅜-inch thickness. Tiles are laid on a fast setting adhesive, and the floor can be put into service immediately. They are claimed to have high tensile strength, be comfortable underfoot, and will not attract or sustain vermin. A matte finish prevents glare.

♦ ♦ ♦

As an illustration of the loose and random manner in which terms are used in the foundry industry, it is interesting to note that with a cupola the charging platform and charging door are at the back and the tapping spout is in the front. The tapping spout on an open hearth furnace is in the same relative position as the spout on a cupola so far as filling the ladle and removal of the metal are concerned, but when men work around the spout they are working at the back of the furnace. The other side, which has the charging doors and charging floor, is known by every open hearth employe as the front side. From a logical standpoint the steel nomenclature would appear to be the more accurate and appropriate.

♦ ♦ ♦

Hot-shortness is more pronounced with silicon bronze than with manganese bronze or aluminum bronze. Hence, use of chills is attended by some risk of cracking if chilling is too severe. Too early shakeout of castings for quick reuse of sand or molding equipment is likely to result in cracking also.

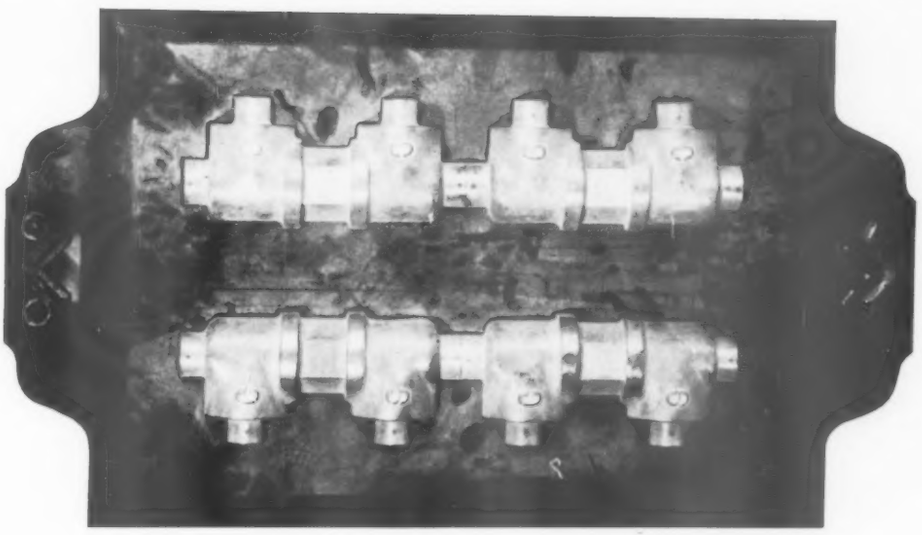
♦ ♦ ♦

Silicon bronzes may be used as alternatives to heat-treatable, nickel-tin bronzes for worm gears according to one authority. One type is composed of 3.50 to 4.00 per cent silicon, 1.25 to 1.75 per cent iron, and remainder copper. The other contains 4.00 to 4.25 per cent silicon, 1.75 to 2.25 per cent iron and remainder copper. The first has a tensile strength from 45,000 to 50,000 pounds per square inch, a yield strength of 19,000 to 22,000 pounds per square inch, and a brinell hardness of 100 to 125. The second has a tensile strength of 50,000 to 55,000 pounds per square inch, a yield strength of 20,000 to 23,000 pounds per square inch, and a brinell hardness of 115 to 140.

♦ ♦ ♦

WHILE the danger from fire in a magnesium foundry always is apparent in the handling of molten metal, and the usual precautions are followed to prevent occurrence, it sometimes is forgotten that the cleaning room may be the source of a fire. However, by following good housekeeping principles the fire hazards can be reduced to a minimum. One of the essentials is to keep it clean by sweeping up 5 or 6 times a shift, particularly around saws. Then if a fire starts it will be small, and can be handled easily. See that the window sash, beams, ledges, etc., are cleaned off regularly to prevent accumulation of dust which may contain magnesium.

LIGNOLITE



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. . . are flat and stay flat because LIGNOLITE has high transverse strength and resistance to deflection. It is impervious to moisture and does not warp from contact with wet sand or high humidity. This tough laminated lignin plastic is also highly resistant to oil, grease, dilute acids, etc. In addition, LIGNOLITE is half the weight of aluminum thereby combining the most desirable qualities so necessary in pattern plates: FLATNESS, LIGHT WEIGHT, and STRENGTH. This material, moreover, is abrasion proof, of uniform caliper, and may be easily machined, sawed, drilled, tapped, etc. Available in all flask sizes $\frac{3}{8}$" to 2" thick or in sheets for own cutting. Please write for sample and complete information.

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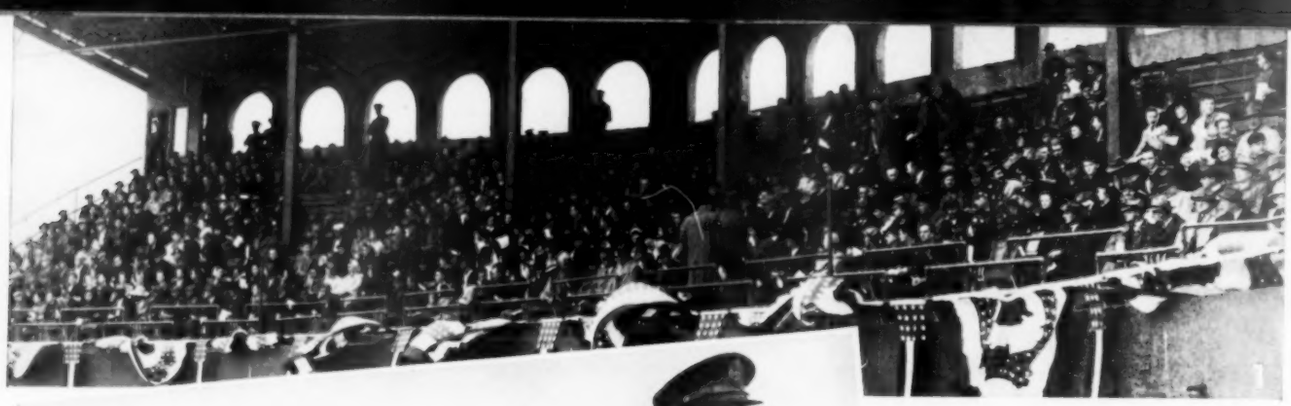


Fig. 1—Employes of the Auto Specialties Mfg. Co., St. Joseph, Mich., attending presentation of the Army-Navy "E". Fig. 2—Lt. Col. Fred Germain commends firm and employes on production record. Fig. 3—Flag being accepted by Charles Sparks on behalf of employes and W. V. Tiscornia, vice president, on behalf of the firm. Fig. 4—Mr. Tiscornia making acceptance address. Fig. 5—Speakers' stand during raising of the colors

ARMY-NAVY "E"

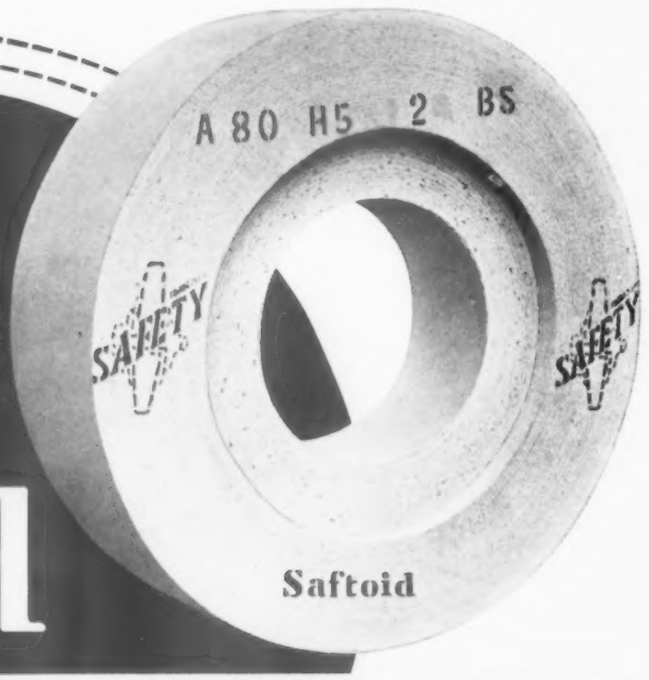
Awarded to

Auto Specialties

THIS CENTERLESS REGULATING WHEEL made of

Saftoid

IS REPLACING THOUSANDS OF RUBBER WHEELS



On thousands of Centerless Grinding Wheel machines these new Safety Regulating Wheels are replacing rubber wheels. Saftoid was developed by Safety Research Engineers when they saw the acuteness of the rubber shortage. Saftoid has undergone the most severe tests in plunge-cut and through-feed operations, and has proven economical, long lasting. A better job throughout has resulted.

SAFETY

7 POINTS OF SUPERIORITY
SAFTOID Centerless Regulating Wheels

1. Less dressing is required.
2. SAFTOID eliminates chipping of edges.
3. SAFTOID holds its shape longer.
4. SAFTOID is more economical.
5. Wheels constructed of SAFTOID give 25 to 100% longer life.
6. SAFTOID wheels cost less.
7. Eliminates worry about rubber shortage.

To prove the economy, dependability, and efficiency of the Saftoid Wheels, Safety would like to have you make tests in your own shop on your own machine. Practically all standard sizes are available for immediate shipment. Write, wire, or phone 4651 your requirements today.

THE SAFETY GRINDING WHEEL AND MACHINE COMPANY

SPRINGFIELD, OHIO — SALES OFFICES IN PRINCIPAL CITIES — ESTABLISHED IN 1892

MANUFACTURERS OF SAFETY MOTOR DRIVEN PORTABLE GRINDERS, SAFETY RITE-SPEED GRINDERS, GRINDING WHEELS FOR EVERY PURPOSE, INCLUDING THE FAMOUS "SAFETY GRIP-LOK GRINDING WHEELS"

INTERNATIONAL MOLDING MACHINES

Castings are required for building many of the most vital War Implements. The castings are almost invariably the first parts that are needed when the construction of the implement starts

WAR Implements must be made in large quantities and all parts used in their construction must be turned out on a **HIGH PRODUCTION** basis—with ceaseless continuity and perfection.

USE INTERNATIONALS to insure the maintenance of casting production schedules. Call for **INTERNATIONAL** Service Engineers to demonstrate the latest developments in **HIGH SPEED** equipment and methods.

INTERNATIONAL MOLDING MACHINE CO.

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new equipment and supplies

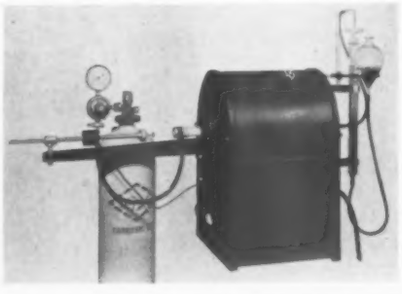
Shakeout

Robins Conveying Belt Co., Passaic, N. J., has developed a full floating foundry shakeout in which the vibrated portion is supported by heavy duty coil springs which also carry the entire weight of the imposed load. Shock loads are not transmitted to foundations or supports. Bearings are completely enclosed and triple sealed with combination piston ring, labyrinth and flinger seals. Jackets for water cooling are pro-

vided when required. Amplitude of vibration may be adjusted to meet varying types of required service. The units are available in sizes from 30 x 40 inches to 14 x 16 feet or larger. They handle weights from 100 pounds to 100 tons. Special designs are available for specific purposes such as secondary decks for removing gaggers and lumps and supporting stands for semiportable installations. The shakeout shown in the accompanying illustration is considered the largest yet produced, and is made up of six undivided units each with dimension of 5 x 6 feet, to provide a total flow area of 14 x 26 feet.

Gas Determinator

Harry W. Dietert Co., 9330A Roselawn Avenue, Detroit, has introduced a new device for determining the gas content of cores and molding sands. The equipment, shown in the accompanying illustration, consists primarily of a combustion furnace equipped with a gas measuring burette, a combustion tube, magnetic boat push, and pressure regulator. In the process three grams of sand are placed in the boat which then is placed in the cold end of the combustion tube. The end of the tube is closed with the magnetic boat pusher assembly. The boat then is pushed into the hot zone. The sample usually is burned in a carbon dioxide atmosphere, or it may be burned in any other chosen atmosphere. Rate and volume of gas evolution are read from the burette. The device may be used to determine the gas content of many materials, for example, the sea coal content in molding and facing sand.



Wood Sole Shoe

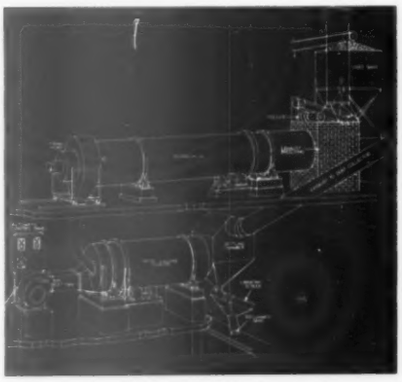
F. J. Stahmer Shoe Co., Davenport, Ia., has introduced a new wood sole safety shoe for women workers. Soles are close grain maple cut with proper rock for ease in walking and correct arch support. The 2-inch heel is covered with a composition lift. Counters are inserted in a leather pocket to provide smooth finish. All seams are water tight. Uppers are attached to the sole with wire and staple stitching. Uppers are pliable full grain tan leather. Shoes are available in sizes from 5 to 10. Safety toes may be incorporated.

Sweeper

Moto-Mower Co., 4600 Woodward Avenue, Detroit, has developed a tractor sweeper. The unit turns right or left by a separate clutch on each wheel of the tractor, which is controlled through the handle bar. Heavy metal chips are picked up as will as light dust or dirt. For large floor space a sulky is available as optional equipment. The latest model is equipped with an adjustable spray which lays the dust, and a heavy bumper. Two of the three models are motorized. The unit also may be adapted for use as a snow plow.

Sand Reclamation

Link-Belt Co., 300 West Pershing Road, Chicago, has developed a new method of reclaiming foundry core sand. Equipment for the new process, shown in the accompanying illustration, consists essentially of granulation of the sand lumps, and uniform delivery to a rotary kiln in which the temperature is between 1000 and 1600 degrees. Fahr. Combination of high temperature and



rotating abrasion removes the carbonaceous and other foreign material adhering to the sand grains by burning or vaporizing. Resultant sand is as clean, and in some cases cleaner than the original new sand. Experience shows constant results with the thermal process.

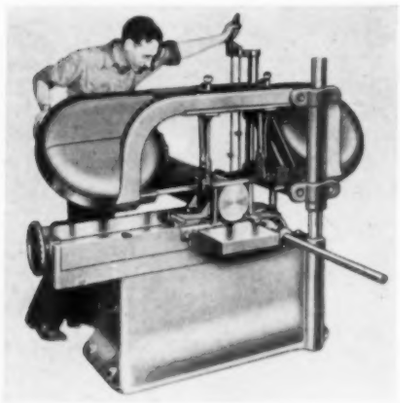
Due to the high temperature of the sand discharged from the rotary kiln, it is essential to deliver it by gravity into a forced draft cooler. For this purpose a rotolouvre cooler is used.

The first installation of the kiln and cooler combination was started in operation September, 1941, at the plant of the Wright Aeronautical Corp., Lockland, Ohio. It has been in constant operation since that time handling a capacity of 4 tons per hour. This shop produces exclusively aluminum cylinder heads for air cooled aircraft engines. The castings are made in dried sand cores. The base sand is a mixture of two pure silica sands accurately classified to a definite screen analysis thoroughly mixed with oil and water. After a year's operation, constant laboratory and operating tests have shown no negative results.

The process is of particular interest to steel foundries producing 40 to 50 or more tons of good castings per day, or heavy gray iron shops with similar tonnage, or any type of foundry using all dried sand core molds.

Band Saw

Wells Mfg. Co., Three Rivers, Mich., is introducing a new metal cutting band saw with capacity 13 x 16-inch rectangular and 13-inch diameter rounds. In addition to the usual features the new model incorporates a hydraulically controlled feed and lift apparatus. The new machine is equipped with a ¾-horsepower motor which drives the blade at any one of three speeds, 53, 94 or 148 feet per minute. With this choice of



speed it is claimed that it is possible to cut almost any metal in almost any shape. The overall height is 52½ inches and the required floor space is 30 x 73 inches. Top of the bed is 24 inches from the floor. Other features include a quick acting hand operated vise, belt and gear drive, ball bearings, total weight 1750 pounds.

Alloy Welding Rod

Eutectic Welding Alloys Co., New York, has developed a new alloy arc rod for welding cast iron by the alternating or direct current process. The rod is the coated type with the same color as cast iron. Tensile strength of the rod varies between 29,000 and 38,500 pounds per square inch with a brinell hardness between 200 and 265. Welds made with the rod are said to be corrosion and heat resistant, and can be galvanized or enameled easily. The rod is designed for jointing and filling blow holes and cracks and for building up metal on heavy, intricate and light castings.

Pump Tank

American - LaFrance - Foamite Corp., Elmira, N. Y., has developed a new pump tank in which the amount of critical materials is reduced to a minimum. In compliance with requirement of the Office of Civilian Defense for controlling magnesium type incendiaries the new tank delivers a straight stream instead of a spray. The new pump tank in 2½ and 5 gallon sizes has an over size air chamber to give minimum pulsation, steady pressure and a more constant stream for a range of 30 to 40 feet. It is a self contained unit readily transported up ladders, over roofs and to other points difficult of access.

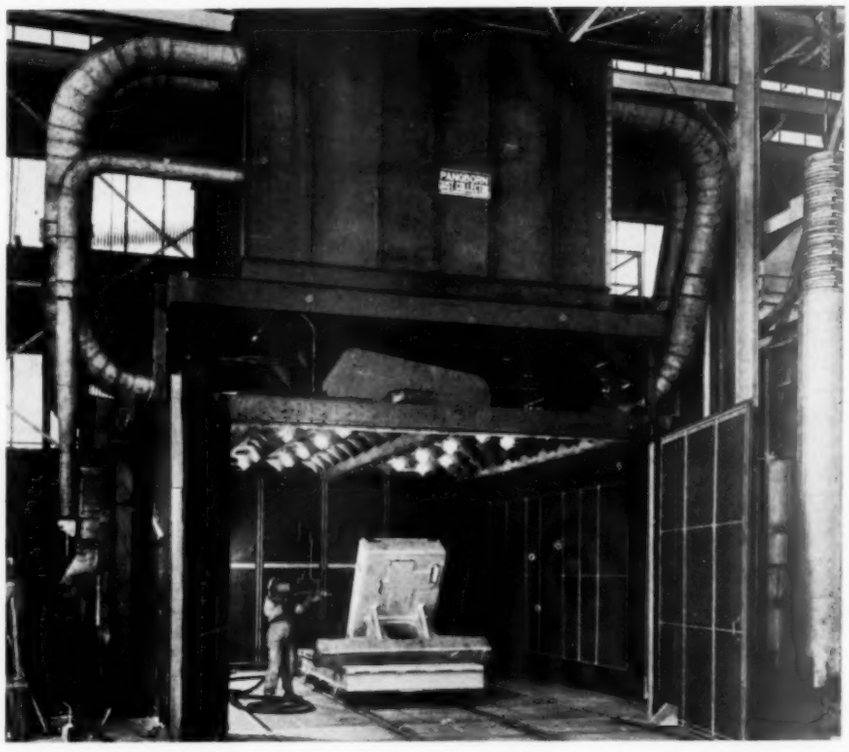
Exhaust Fan

Chelsea Fan & Blower Co., Inc., 1206 Grove Street, Irvington, N. J., has developed a small portable unit exhauster and blower designed to remove gas fumes, etc., from various places including welding rooms, tunnels, vaults, basements, etc. The machine is powered by a ¾-horsepower motor, has newly developed heavy steel wheels, sucks or blows 2000 cubic feet per minute, operates in any position and weighs only 70 pounds. Units are provided with three 4-inch, or four 3-inch nozzles for flexible hose. Nozzles not in use may be closed with suitable caps.

Shell Sprayer

DeVilbiss Co., Toledo, O., has developed a line of high speed, automatic shell coating equipment designed for wide adaptability in finishing operations on bombs, shells, shot, grenades and cartridge cases in sizes ranging from 20 to 155 mm. Though basically similar, each unit is engineered specifically for a certain job. Spraying stations are located at one or both ends of the conveyor. On one type three stationary automatic spray guns are actuated only when the shell or other object moves within range. Another outfit employs two guns, one for inside and one for outside spraying. Both move automatically with the shell horizontally and vertically. A third model has a spray gun with a hook type extension. This and another moving extension gun coat all interior surfaces while a third gun paints the outside. Conveyor length is determined by the drying and handling requirements.

Blast Room Handles Large Gun Mount



Heavy production of guns and gun mounts has placed tremendous demands upon the blast cleaning departments of many large foundries, keeping step with this rising production has meant the building of larger and more efficient blast cleaning rooms. An example of modern room construction is shown in the accompanying illustration, where a unit, large enough to accommodate the heaviest gun mount, is shown with overmounted dust collector sufficient to keep the room ventilated even when blasting is being done by two operators. The illustration shows the full opening provided by the large dust proof doors, the ample supply of interior illumination and the many ventilator caps providing continuous circuit of fresh air from the top of the ceiling down through the perforated steel plate of the floor. Operators are protected by air-fed safety helmets which give them wide angle of vision yet are light and comfortable to wear, plus a maximum of safety. A special railroad siding going directly into the room makes the handling of heavy castings a simple matter once they are placed upon steel trucks. Illustration courtesy Pangborn Corp.

WHY YOU SHOULD GIVE FIRST CONSIDERATION TO

SLY BLAST ROOMS

*Triple ceiling to assure complete and uniform ventilation. *An *extra* layer of steel on walls and doors. *An *extra* steel grating to support the floor plates. Better lighting—special dust-tight fixtures with extra heavy globes—abundant illumination. What is your cleaning problem?

*Exclusive Sly Features

Shown above is a cast steel lead melting pot cleaned in a Sly Blast Room.

THE W. W. SLY MANUFACTURING COMPANY

4753 TRAIN AVENUE CLEVELAND, OHIO

CLEANING CASTINGS

In a Midwestern Shop

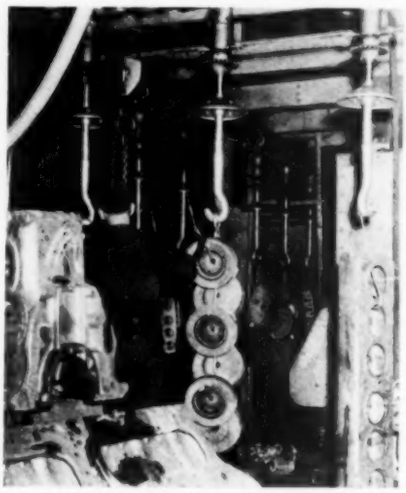
THOROUGH cleaning of castings weighing from one pound to one ton is obtained with a single blast cleaning machine at the Spring City Foundry Co., Waukesha, Wis. Over 95 per cent of the foundry's entire production of green castings is handled by the machine, with approximately half the total tonnage clearing through a second time to remove scale after heat treating. Cleaning capacity ranges from 4 to 6 tons an hour, depending upon the work being handled. Foundry production covers a wide range of casting shapes and sizes.

The blast cleaning equipment is a special cabinet supplied by the American Foundry Equipment Co., Mishawaka, Ind. It employs an airless abrasive blasting method using three wheels, each throwing 450 pounds of abrasive a minute by centrifugal force. Wheels travel at 2250 revolutions per minute. They are 19½ inches in diameter, and 2½ inches wide, mounted on one side of the cabinet. A monorail conveyor, with hooks on which castings are hung, indexes in front of each wheel so the work passes through the abrasive stream of each.

A sand blast room is used for castings beyond the one-ton capacity of the centrifugal machine, or for castings that do not lend themselves to hooking, while a tumbling barrel is employed for service on work on which a tumbled finish is specified.

The abrasive cleaning unit is said to remove every trace of foundry sand or scale from castings put through the machine, and a "touch-up room" for manually cleaning corners or pockets of intricate castings with compressed air sandblast is unnecessary.

The machine consists of a cabinet of plate steel construction, and work to be cleaned is taken through this cabinet on a monorail conveyor. For loading and unloading, the conveyor passes parallel to two sides of the cabinet and some distance from it. Abrasive and scale drop through a grating below, and are moved by a conveyor, located in a pit below floor level, to a position from which they are carried by an elevator to a separator mounted above the cabinet. The separator removes scale and fines from the abrasive before the latter is returned to the blast wheels for reuse.



View of the loading station. Castings on hooks in background are emerging from the cabinet

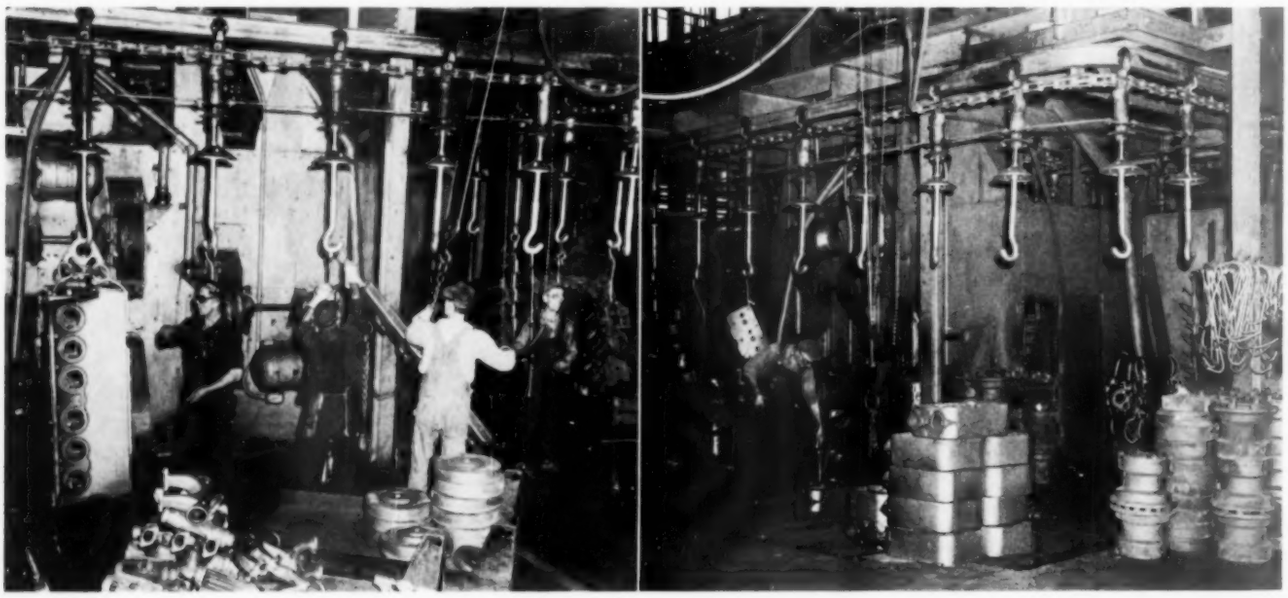
The three centrifugal blast wheels are mounted at the front of the machine. Wheels are staggered as to height from the floor to give an abrasive blast to all parts of the work, and to provide for cleaning a wide range of work sizes. Each wheel is driven by an individual 20-horsepower, totally enclosed, fan-cooled motor.

Work is loaded outside the cabinet on to hooks suspended from the conveyor and at a point opposite one of the short sides of the cabinet. The conveyor moves each hook one station at a time, and in normal operation at the Spring City Foundry 40 hooks pass through the machine per hour, each with a loading capacity of 2000 pounds. The conveyor carries the work before the wheels several times, stopping and rotating it directly in front of each wheel just before taking it out of the cabinet.

On entering the cabinet the work, traveling parallel to the blast wheels but at the far side of the cabinet, receives the benefit of abrasive that misses work directly in front of the wheels, and rebounds from work at other positions in the cabinet. The work takes numerous other positions in the cabinet as it progresses toward positions directly before the blast wheels. The conveyor then passes the work out of the cabinet for inspection and unloading.

Thirty-seven hooks or positions are provided on the conveyor. Twenty-two hooks are within the cabinet or in entrance and exit stations at one time, while the remaining 15 hooks are outside the

(*Concluded on page* 118)



Left—Unloading station. Core rods being removed in casting at left while an overhead hoist removes long casting shown at center. Right—General view of the abrasive cleaning unit at end of day's cleaning operations with worker blowing abrasive from pockets of last casting cleaned. Grating around machine permits abrasive to fall into a pit under entire machine

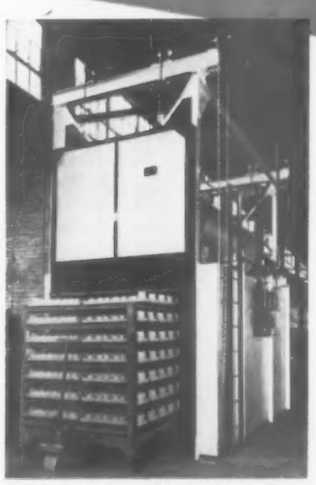
By pulling together . . . . we will soon make the Axis "high-tail" it!

Carl-Mayer's creative ability, coordinated with the demand of Victory production, is making Core and Mold Oven history. Carl-Mayer Ovens are not only built for super-speed and fuel economy but have the stamina to take the severe punishment of continuous service.

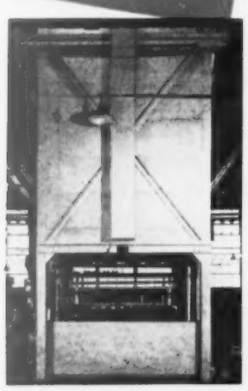
Wire for a Carl-Mayer Engineer, or write for Bulletin 141.

Speed War Deliveries with CARL-MAYER OVENS

Carl-Mayer Monorail Type Continuous Conveyor Core Oven. Installations at Ford, Packard and other leading plants.



One of two Carl-Mayer Rack Type Core Ovens at Fremont Foundry Co.



Typical large Carl-Mayer Vertical Core Ovens as installed at outstanding foundries.

Carl-Mayer
3030 Euclid Ave., Cleveland, O.

All Types **CARL-MAYER CORE AND MOLD OVENS** *All Sizes*

SERVING CONCERNS LIKE *these:*

Aluminum Co. of America
American Magnesium Corp.
American Radiator & Standard Sanitary Corp.
Babcock & Wilcox Co.
Bridgeport Brass Co.
Bucyrus-Erie Co.
Brown Industries Corp.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fort Pitt Steel Casting Co.
Frank Foundries Corp.
Fremont Foundry Co.
G & C Foundry Co.
General Motors Corp.
General Electric Co.
Gilbert & Barker Co.
International Heater Co.
Packard Motor Co.
Shenango Penn Mold Co.
Studebaker Corp.
Whiten Machine Works
Whiting Corp.

(*Continued from page* 116)

cabinet in loading or unloading positions.

Multi-pass of work before the wheels is said to permit proper cleaning action from the abrasive, and at the same time to shield walls of the cabinet from direct abrasive blast.

In operating practice at Spring City Foundry, the bulk of the cleaning is done on the shift when pouring is lightest. Work taken from the molds goes to shakeout, and then is stacked adjacent to the special cabinet for cleaning. Size 17 shot is used in the machine.

Four men normally are employed in blast cleaning operations, two for loading and two for unloading. Work is staggered on the hooks, with very large pieces in one position and a group of small pieces on the adjacent hooks. Overhead hoists facilitate loading of large castings, and their transfer to grinders after cleaning. Small castings are stacked on skids, and moved by truck from shakeout to the machine, and then to the grinders.

Heat Treating Furnace Uses Forced Convection

A new type of forced convection heat treating furnace with heating capacity up to 1750 degrees Fahr, has made possible a speed-up in hardening, annealing, normalizing, tempering, nitriding and other heating operations with an accompanying saving in floor space and labor. The new unit, developed by the Lindberg Engineering Co., 2444 West Hubbard street, Chicago, has increased production in instances from 3 to 12 times over old equipment occupying the same floor space. This is due to the fact that forced convection heating permits the handling of work on fixtures or in work baskets rather than spreading it out on the hearth as with conventional type box furnaces.

This heats totally by forced convection to 1750 degrees Fahr. The heat is forced under pressure by a high velocity

fan through every part of the charge. This eliminates radiation to the work from a source hotter than the desired work temperature, and does away with one-sided heat which may strain, distort or pull work out of shape.

A furnace requiring a floor area of 6 by 9 feet or 54 square feet is shown below. This unit replaced furnaces occupying 324 square feet. Besides the saving in floor space, the new type furnace doubled the production of the older furnaces.

In the new type furnace, the castings are loaded into a basket, charged into the furnace, and dumped when thoroughly heated. In 8 hours the new unit annealed as much work as the old furnaces could handle in 16 hours.

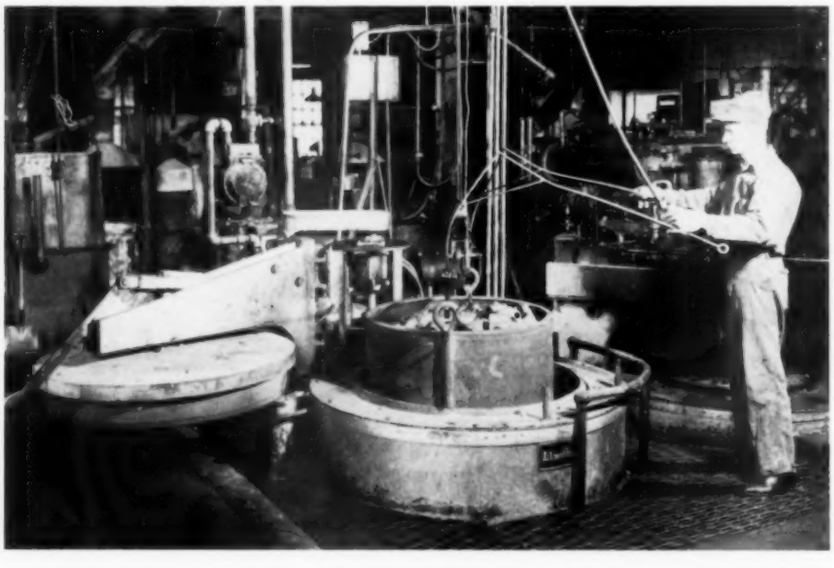
For normalizing or hardening steel castings a large Wisconsin foundry is using furnaces 60 inches in diameter by 48 inches deep such as shown above. The normalizing load is approximately 5000 pounds per furnace. Time required for the charge to reach the 1520 degrees Fahr. normalizing heat is 2 hours and 15 minutes. The castings are held at this heat for one hour and then air cooled. This 3¼ hour cycle permits 7 heats to be handled each 24 hours for an average daily production of 35,000 pounds.

On work to be hardened, the loads are limited to 2400 pounds. This is due to temporarily limited quenching equipment. The parts which have a maximum cross section of 1¼ inches are heated to 1600 degrees Fahr., the cycle being 1 hour and 45 minutes. Brinell hardness following the quench is 207 to 241. Twelve loads are being hardened per 24 hour period for an average daily production of 28,800 pounds.

Heating is by gas, oil or electricity. The circulating fan is in a separate chamber away from the work chamber where it is safe from damage that might result from careless handling in loading or unloading operations.

The fuel fired furnace consists essentially of work chamber, fan chamber, and combustion chamber. The electric furnace has the work chamber, the fan chamber and the heating element chamber.

All parts subjected to high temperatures, the fan and fan shaft, the air ducts, are of nickel-chromium heat resisting alloy. The furnace is made in 30 standard models ranging in work chamber size from 16 inches diameter x 20 inches deep to 72 inches diameter x 84 inches deep.



New Core Drying Oven Aids Casting Production

By JOHN HUBEL

With foundry work being pushed to the utmost, in an effort to produce castings needed for defense purposes in record time, the core rooms often are blamed as bottlenecks where delays occur. This condition has been responsible for the installation of many labor-saving devices and equipment in corerooms. The drying of cores is often one of the slow-moving operations to which delays are charged, so that a great deal of attention has been given to coreroom operation.

At the plant of the James Mfg. Co., Fort Atkinson, Wis., in which thousands of cores must be dried each working day, a new core oven, of the vertical type, has been installed, which has given good results. The drying oven, of the gas-fired type, was manufactured by Drying System, Inc. It is 9 feet wide, 8 feet 3 inches deep and 15 feet high. The height given is that of the oven housing, which sets about 6 feet 6 inches above the floor of the plant. It has a capacity of 6000 dryers on trays per day. Carriers are provided with three shelves and these have a capacity of 48 dryers per carrier. Baking time is estimated at 37 minutes, but cores have been baked in this oven at a faster rate than the estimated time. Baking temperatures are approximately 500 degrees Fahr.

In this core baking oven the heating is accomplished by means of direct gas-fired burners firing into an internal combustion chamber which is baffled suitably for proper heat distribution. The convection heat principle is applied, using a large volume of air for circulation and recirculation.

(*Concluded on page* 121)

THERE'S A POINT IN

Saving

THIS YEAR

Reclaiming Core Wire—Large Eastern Foundry

DURING the past 35 years hundreds of foundries bought and used Climax Wire Straighteners.

These foundries considered it good business practice to economize by re-using core wires and rods.

Cutting costs *was* good business—and still is, but there's an even better reason for using a Climax now.

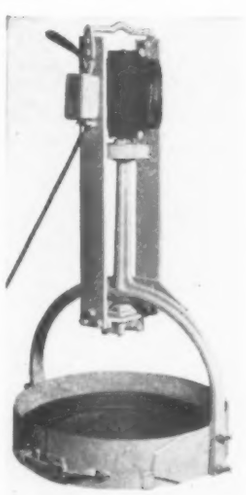
Every pound of wire and rod that is re-used is a pound of steel saved—every pound of steel saved is a contribution to our victory over the Axis!

You will find no better means of straightening core wires than with the Climax Wire Straightener.

One of the three Climax models will usually straighten all the various sizes you use. The Climax straightens wires and rods quickly, safely and economically and does not require experienced help for its operation.

We have prepared a new circular which describes and illustrates all three models of the Climax Wire Straightener. It's yours for the asking—why not write for it now?

THE LOWE ELECTRIC SIFTER



● An old friend with a new "zip." Faster sifting than ever before due to the new-design malleable yoke.

Easier loading for there's more clearance above the screen surface.

All wearing parts are easily replaceable —the Lowe is never long out of service.

Totally enclosed ball bearing motor ensures long unfailing service at low cost.

You'll get better castings when you screen your sand with a Lowe Electric Sifter.

Have you tried a Wonder Cutter? You can't beat it for cutting rods, wires or small band iron. It's inexpensive too.

FEDERAL TWISTED STEM CHAPLETS

● The ideal foundry chaplet because:

Uniform stem strength from head to head—no weakening deformations to permit collapse and failure.

Perfect fusion —every time results from four sharp fusion edges the entire stem length.

The smooth stem will not collect gas-causing dirt and offers no pockets to trap gas.

"The Twist Does The Trick"

THE FEDERAL FOUNDRY SUPPLY CO.

4600 EAST 71st STREET, CLEVELAND, OHIO

CHICAGO — CHATTANOOGA, TENN. — DETROIT — MILWAUKEE — MINNEAPOLIS — NEW YORK — RICHMOND, VA. — ST. LOUIS — UPTON, WYO.

• • • STERBACK • • •

Sterling's New, Better Grinding Wheel For DELTA, EXCELLO, PROSSER, SELLERS, BALDOR, HEALD, FINN GRINDERS

Foundrymen Check These Features:

No Steel!
No Rubber!
No Slipping!
Light Weight!
Easy on Bearings!
No Backs to Return!

FOUNDRY machinists are already using Sterling's New STERBACK Grinding Wheel for Tungsten Carbide Bits, radius on high speed tools, and drill points. STERBACK is an entirely new development that employs no steel or rubber. You need not wait - quick delivery is assured! STERBACK is lighter in weight, easier on bearings, more efficient to use. No steel plates need to be returned.

The flexibility and light weight of the material out of which the back plate is made provides many advantages that lengthen the wheel's life and improve its cutting action.

Foundries need these wheels for better, faster grinding. They have been thoroughly tested on various jobs and machines. They are recommended as lasting, efficient, time-savers for any foundry machine shop. Use them with confidence.

You should have Sterling Catalog No. 42 in your file . . send for your copy today.

• STERLING ABRASIVES •

THE
STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

(*Concluded from page* 118)

The combustion chamber furnishing the heat for drying the cores in the oven is designed specially for the purpose. In the combustion chamber of the heater there is a heavily reintorced outer shell, which is first lined with a 4-inch wall of high-temperature insulation. This is followed by a wall of high grade refractory, capable of withstanding the high flame temperature developed by the complete combustion of gas fuel. The mixing chamber is lined with insulation and reinf rced with fire brick tile at the points of greatest temperature.

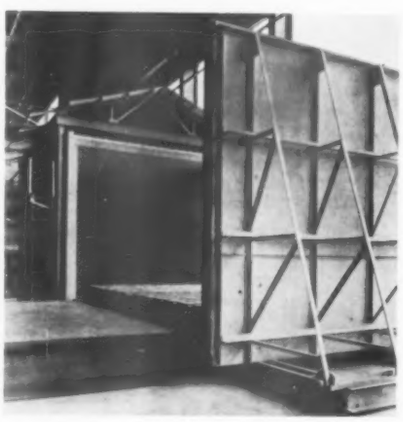
The mixing chamber of the heating equipment is located above the combustion chamber, so that the products of combustion, at high temperature, converge at right angles with the cooler induced draft of the heater inlet, which travels at a sufficient distance to insure dilution and temperature equalization in the mixing chamber before delivery to the oven through the outlet duct. The combustion temperatures are held within proper limits to protect the refractory lining against excessive deterioration.

The conveyor is designed for 19 carriers spaced on 27 inch centers. The carriers are supported on 1½ inch pipe cross rods, the conveyor speed being adjustable within a 3:1 ratio, making it possible to adjust the speed to suit various kinds and sizes of cores.

Safety devices of the latest type are installed near the oven, to protect the system against fan, power or gas failure. The devices consist of a flame detector, an air-fl w switch, a solenoid pilot valve, solenoid safety shut-off valve and complete automatic ignition.

Heat Treating Furnace

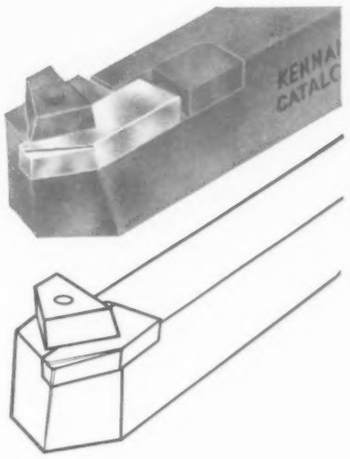
Vulcan Corp., Philadelphia, recently has designed a car hearth furnace in which a new method of direct firing produces a convection effect with resulting greater efficiency, uniformity and economy. Advantages claimed include: Less time to heat a charge uniformly to required temperature, better uniformity at desired temperature, more rapid uniform rates of heating even though charges are



not loaded uniformly, elimination of localized high temperature areas, reduced maintenance and lengthened life. It is claimed the furnace is particularly suitable for treating castings in large dense loads. It may be fired with gas or oil and is provided with several zones of control.

Carbide Tool

McKenna Metals Co., 131 Lloyd Avenue, Latrobe, Pa., has placed on the market a new type clamped-on carbide tipped tool which differs from the previous type in that the clamp is secured by a screw inserted from the bottom of the tool, as shown in the accompanying illustration. A flat surface is milled out of the tool shank to accommodate the cutting tip. As the tip is reground it is moved forward. When the tip becomes too small for service in this tool, it may be brazed into a small shank for light work. The clamped-on tip permits the use of a durable heat treated shank and better grinding results when the tip only is touched to the wheel. This eliminates tool crazing or checking of tool edges



and the grinding wheel does not become clogged or glazed. The new tools are available in three square sizes, 1, 1¼, and 1½ inches, and in two flat sizes the dimensions of which are 1 x 1½ and 1½ x 2 inches.

Carrier

Ernst Carrier Sales Co., 1456 Jefferson Avenue, Buffalo, has introduced a new stacking box carrier designed especially to handle a column of self nesting boxes of finished parts, scrap, castings and similar materials. Built-in wedge at bottom of lift post eliminates use of a skid. After sliding the wedge under the stack the operator leans on the handle to lift the load 3 inches from the floor. In the horizontal position the handle automatically locks. Forward swaying or tipping is eliminated by adjustable clamp. Side sway is eliminated by a reinforcing bar. The device is equipped with four large wheels. Square base inside measurement is 33 inches. Rated capacity of the new type stacking box carrier is 1500 pounds.

Acid Resistant Fans

Despatch Oven Co., Minneapolis, recently has placed on the market a line of alloy steel acid resistant fans suited to virtually all heavy duty high volume requirements involving temperatures up

to 1600 degrees Fahr. Design and construction combined with precision balancing provide efficiency and smooth operation. Fans are available in eleven sizes ranging from 12 to 48 inches diameter, in capacities up to 20,000 cubic feet per minute and handling total pressures up to 10 inches water gage. Outlet may be arranged in 16 standard positions. Belt drive on all models and wheel is overhung. Shaft is supported on two air cooled bearings. A device dissipates heat from the shaft before it reaches the bearings. Fan wheel, shaft, etc., easily may be removed without disturbing housing.

Portable Welder

Hampton Electric Mfg. Co., 314 Archie Street, Oakmont, Pittsburgh, has developed a new arc welding machine which operates on either 220 or 440 volts, has a welding capacity from 30 to 300 amperes and can be operated continuously at 225 amperes. Welding current can be controlled for heats between minimum and maximum by turning a crank at the top of the machine. The machine is protected against excessive over loads for a long period. Windings are square wire ample in size to permit considerable overload. A stabilizer in the welding circuit controls and bal-

ances the voltage and current across the arc, thus decreasing spatter and assuring a homogeneous weld.

Copper Situation Is More Critical

Supply of copper is so critical that the WPB believes reduction of melting loss is extremely important in conserving that metal as well as tin, lead, zinc, etc., and in consequence copper-base scrap is to be diverted increasingly from foundries to secondary alloy ingot producers who can use the available scrap most efficiently. Guy P. Norton, chief, Scrap Unit, Copper Branch, WPB, stated at a meeting of the nation's 75 ingot producers in New York on Dec. 1 that these organizations have the technical knowledge and special facilities for efficient recovery. He praised the industry for increasing production of quality ingots while the grades of scrap and copper available were going down. The half dozen or so ingot makers whose special facilities and expert metallurgists have made records in converting low grade scrap are to be asked to share their "know how" with other ingot makers.

According to Michael Schwartz, chief, Scrap and Conservation Section, Copper Branch, ingot producers are expected to turn out over 700,000 tons of ingot in 1942 instead of the 360,000 tons counted upon at the beginning of the year. Carter S. Cole, Scrap and Conservation Section, announced a new series of war alloys, and recommended that the ingot industry reduce the number of standard copper-base alloys from around the present 90 to only 30. Substitution of silicon-copper alloys for high tin copper-base alloys is not to be pushed because copper is actually more critical than tin. It is more important to save the additional 4 to 5 per cent copper required in silicon-copper alloys than it is to save the amount of tin involved.

Revise Alloy Sizing Standards

To facilitate storing and to expedite deliveries of certain ferroalloys and metals, new and simplified ranges of standard sizes have been established and are being produced by Electro Metallurgical Co., New York. New ranges of lump, crushed and ground sizes have been chosen to meet all of the user's essential requirements with a limited number of standard sizes which enables the manufacturer to stock them for prompt shipments particularly with reference to finer mesh alloys and metals. That also makes it possible for the user to reduce his inventory.

Book Review

Industrial Accounting In a War Economy, year book of the National Association of Cost Accountants; 213 pages 5½ x 8½ inches; published by the National Association of Cost Accountants, 385 Madison Avenue, New York.

This year book contains a report of papers and discussion presented at the twenty third International Cost Conference of the National Association of Cost Accountants held at the Palmer House, Chicago, June 22-24, 1942. The program was arranged in five sessions: 1—Wartime problems and responsibilities. 2—Wartime inventory problems. 3—Accounting problems arising from war contracts. 4—Wartime cost problems. 5—Taxes and post war problems.

Valve Company Wins Maritime Pennant

Homestead Valve Mfg. Co., Coraopolis, Pa., has been awarded the Maritime Commission "M" pennant, victory fleet flag and merit badges to the company's employes. Col. Willard F. Rockwell, director of production, U. S. Maritime Commission, in presenting the awards said in part: "You have used imagination, skill and determination in meeting Maritime requirements and the methods you employed here to reach the astounding production figure of 800 per cent over 1940 certainly expresses a will to win this war, second only to our brave men on the battle-front." F. E. Schuchman, general manager of the Homestead company, accepted the "M" pennant with a pledge that his company will have earned the right to keep the award at the end of the six months' period. Lawrence E. Coulter represented the employes in accepting the labor merit award insignia.

New Ingot Forms

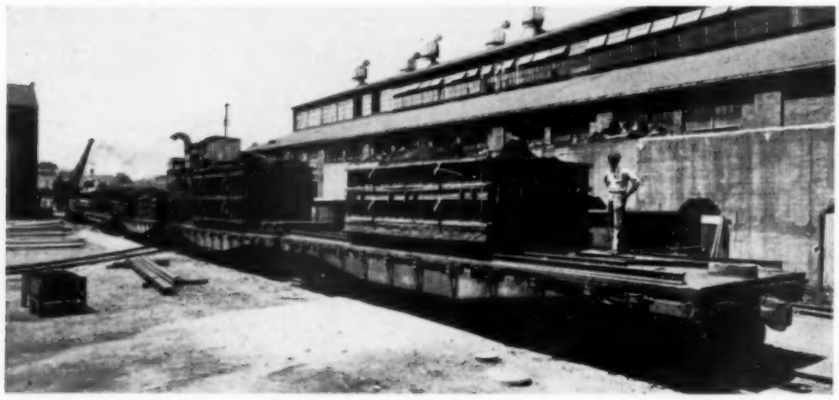
Brass foundries and ingot producers will report their inventories of ingot to the WPB on two new forms announced early in December. Foundries will report on form PD 59B and ingot makers on PD 751, and from those the Copper Branch, WPB, will learn how much ingot now being held cannot be used for war orders on hand. If that ingot is not to be used within a reasonable time the foundry and ingot maker must exchange it or remelt it into a usable alloy.

Prepares Booklet

"Employe Magazines" is the title of a booklet recently prepared by the Policyholders Service Bureau of the Metropolitan Life Insurance Co., 1 Madison avenue, New York, as a first of a series on that subject. The booklet is a report of a survey made by that organization of 282 employe magazines; formulating the magazine's policy; turning the policy into a plan; determining the budget; financing the magazine; the editor and staff; training the correspondents; physical factors; layout; illustrations; and distributing the magazine.

British Information Services, 30 Rockefeller Plaza, New York, recently has published for free distribution a 32-page booklet discussing in considerable detail Britain's war production program under the heading "Industrial Mobilization of Great Britain."

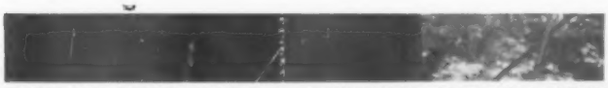
Flat Cars Solve Problem of Floor Space



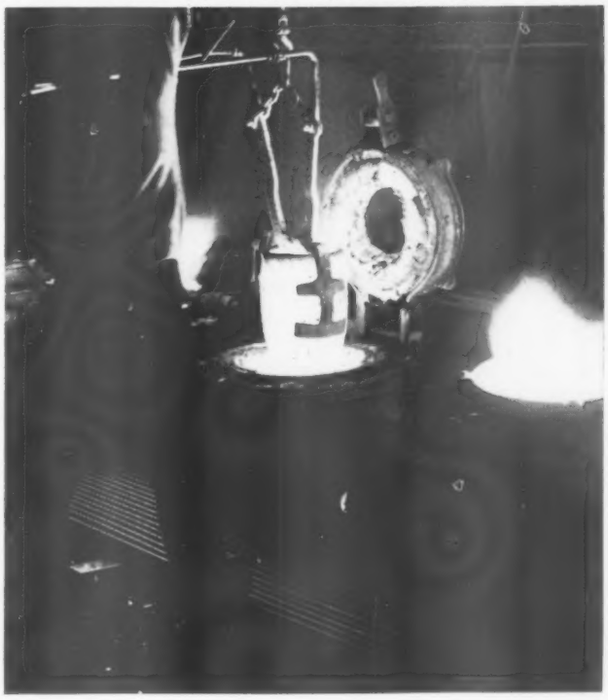
To utilize foundry floor space to the fullest extent, the Cooper-Bessemer Corp., Mt. Vernon, O., converted a string of obsolete railroad flat cars into a cooling department. Rails were laid on the car decks. Shortly after the molds are filled with metal they are lifted from the floor and loaded on the cars which then are switched into the yard. In some instances large castings are loaded on the cars and taken into the yard to be chipped and cleaned

One crucible furnace or a dozen represents a small investment when you consider the rate of production made possible through the use of crucibles for melting non-ferrous alloys. Gas, oil or coke may be used as fuel. The crucibles are lifted out with tongs, and without transferring the metal to any other container, the flasks are poured off *direct*. The metal can't chill. Time required for melting is about half an hour. Another advantage beyond this speed is *flexibility:* the alloy may be changed whenever desired . . . there is no absorbed metal in the crucible to contaminate the next melt.

FAST ··· FLEXIBLE



BEFORE YOU DECIDE ON NON-FERROUS MELTING EQUIPMENT, CONSULT A CRUCIBLE FURNACE MANUFACTURER, OR WRITE TO US



CRUCIBLES FOR ECONOMY

CRUCIBLE MANUFACTURERS ASSOCIATION

90 WEST STREET, NEW YORK, N. Y.

Recalls Many Years

SPENT IN THE FOUNDRY

By WILLIAM GUDGEON

THE general public including in some instances the owners of foundries, does not realize what patience, skill and laborious work is necessary in the making of molds that will receive and withstand enormous pressure of molten metal until solidification takes place and the object is dug up a week or so later in the form of a gray colored iron or steel casting.

Thirty-five years as a working molder on a variety of foundry floors enables one to understand the psychology of his fellow craftsman and the risks to life and limb to which the nature of his work exposes him.

The statement has been made that the time necessary to acquire the skill of a jobbing molder is 20 years. Certain it is that self confidence comes only after something like that period. Not being able to see what is taking place when a mold of any size and depth is filling with molten metal makes that operation something like a blind one. These are the few minutes when the molder responsible for the building of the mold must be sure of every operation he has performed, confident that he has not overlooked anything. Too late at this time to wish he had done such and such a thing to make sure as he sees tons of liquid metal disappearing from view.

The Mold Gave Way

While the metal is entering the mold a feeling of nervousness and tense anxiety is plainly visible on the faces of those responsible for the molding of large castings.

In one northern foundry I lent a hand in the casting of a 13-ton condenser 9-feet deep, built in a loam mold and rammed in a pit to floor level.

A few days previous to pouring the casting the molder who had the job in hand occasionally would stop working and survey the job and go into a deep study as if undecided about something.

As we turned the wheel of the ladle I glanced at him. From the nervous, worried look in his eyes I sensed something was wrong as the mold drank up the metal greedily, and I sensed right.

The ladle held 17 tons of iron, enough for the condenser and for another job up in the shop.

That condenser mold surely had a thirst. It gulped all the 17 tons and probably would have taken a few tons more had the metal been there.

The mystery was cleared up the following morning when the top plate was lifted. We could see where the iron had run to a point 3-feet from the top, then subsided, and settled a foot or so from the bottom.

Men were kept busy at the bottom of the pit for several days breaking chunks of iron which resembled roots of a giant tree. Some of the iron is there yet.

Some years later when I worked with the molder in another part of the country, he confessed he had lost a few nights' sleep over that job. He had gone wrong with his calculations of head pressure and the liquid iron had found a weak place at the bottom of the mold and found its way into a vein of quicksand. He hinted that extra precaution at the base of the mold along with hard solid ramming of the sand at the bottom of the pit would have saved the casting.

Skill Required in Foundry

Opportunity in the iron and steel industry is a fickle thing and can be either the gateway to success or failure. Securing orders is one thing, turning the castings out to specification is another. Through failure to turn out sound castings I have seen bank balances of more than one iron master slump down dangerously near bankruptcy level. At such time those in command nearest the foundryman are compelled to recognize the skill required to turn out sound castings.

During the great industrial depression a few years ago when competition was at the cut throat stage, I worked in the foundry of a large electrical works in England. The head foreman molder, a personal friend, informed me the firm had secured an order from a big industrial corporation in India, for ten large stator frames cast in halves, each half to weigh 20 tons. Under ordinary conditions this order would not have given him cause for the least worry. Castings of the same design up to 16 tons were turned out of this foundry from a full pattern in skin dried molds.

Necessity of economy and speed suggested a strickle to save time and timber in patternmaking. This meant a mold built with bricks and loam. Unfortunately among his 60 men there was no fully skilled loam molder. This worried him. He asked me if I could put him on to a reliable man. He admitted frankly that he knew very little about loam molding.

Without any hesitation I mentioned the name of a man who had been in the foundry only two weeks. He had drifted from one of the shipyards on the Clyde and through my influence with the foreman had secured a temporary job. On former occasions I had seen him in charge of important work; turbine castings, huge bedplates, corliss cylinders, air vessels, all sizes of condensers. On his present job he was working 12-inch flasks.

"He's your man," I said.

The foreman glanced in the direction of the small, wiry man I had indicated. Apparently he was in the early thirties, but actually he had stepped over the fifty line. The foreman seemed to be amused.

"You'd better grab him," I said advisedly, "and get him interested before the sun begins to shine."

Among the Clyde men he was known by the name Dodgers. He asked the foreman for a small sketch of the job, with dimensions. With the patternmaker he studied the slip of paper for about 20 minutes and examined the core boxes. With the help of a strong handy apprentice and a laborer he started operations. He made the top and bottom plates, grid for top plate, three building rings and at the end of 5 weeks poured the first half stator frame. None of the mishaps, accident and final disasters predicted by the whispering wise ones in that sand hole happened.

Skill Breeds Confidence

When the craneman slowly started to hoist the bottom plate, shaped like a three-quarters moon, with its wall of bricks and loam 9 feet high, the watching wise ones shook their heads. In their estimation it was top heavy and certain to topple over in the journey down the shop to the stove. Dodgers did not worry. He had confidence in every move he made and was expert in knowing how to arrange lifting tackle and maneuver unwieldy loads.

On the final day even the foreman was nervous and uneasy. Two hours before pouring the job he asked me to ascertain of Dodgers if he was sure everything would go off all right.

"Go off all right!" Dodgers laughed, and looked up in surprise. "Like pouring one glass of milk into another glass," he said confidently.

After making another frame, Dodgers told me he was bored with the job. He made an excuse to get his pay packet. The real reason of course was that the sun had started to shine and the birds to sing. He felt the old pull of the open road.

Certain scientific facts must be observed in connection with iron and steel if accidents are to be prevented. For instance, the molecular structure of met-

(*Concluded on page* 126)

Major PRODUCTION Operations
DEMAND THE BEST
And "the best" in Chaplets, Chills and Superchills (patented) has long been identified with the fine old name of Fanner.
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THE FANNER MANUFACTURING CO.

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(*Concluded from page* 124)

al is affected by extremes of temperature. Lifting gear may become dangerous to use after being subjected to extreme cold. A molder wanted to move a cast iron flask or molding box, half buried in the floor, with a 3-ton casting in it. The regular crane chains were in use on another job so from out in the yard he dragged a pair of heavy chains into the shop. These chains had been lying out in the foundry yard a few days and nights in a hard frost. An old graybeard, walking past the job as it was slung and ready for lifting, noticed the hoar frost on the links.

"I wouldn't use that chain if I was you," he advised the man.

"Should lift three times the weight," the other replied confidently.

The ancient one halted for a moment to take a second look, shook his head in silent disapproval, replaced his little black clay pipe and nimbly hopped out of the danger zone. He had seen frozen chains before.

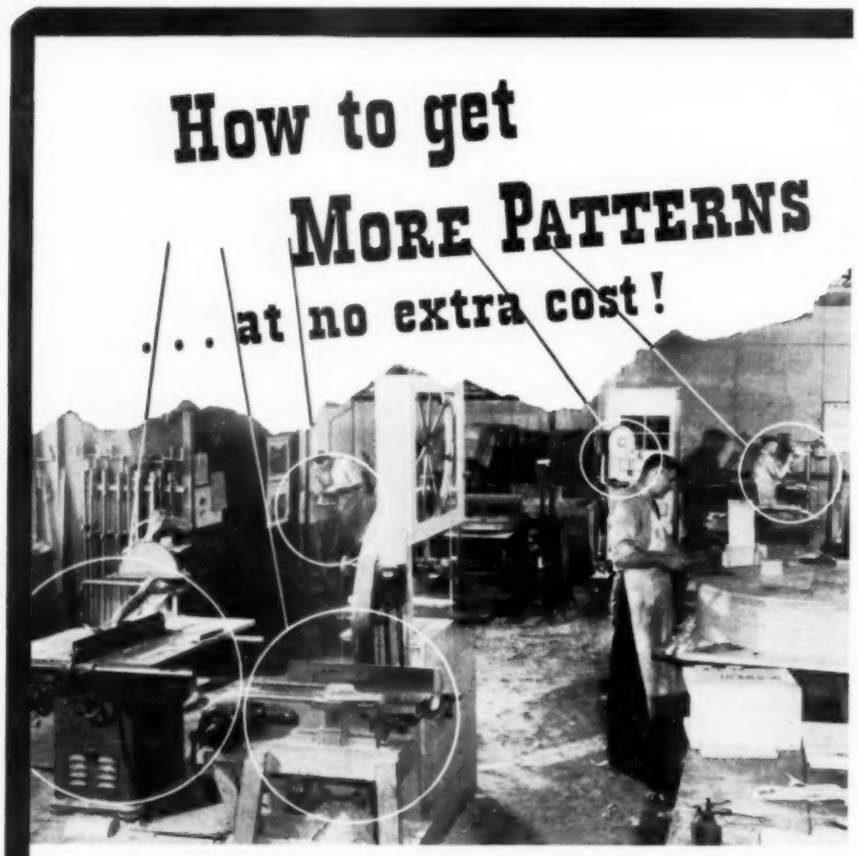
The accident happened in a flash. The craneman put a strain on the load. The chains tightened and then a link snapped and flew through the air like a bullet from a rifle. When we picked up the man who would not listen, he was unconscious with blood flowing freely from a wound one inch above the eye. A broken $\frac{5}{8}$-inch chain link rested near him. When the broken link was examined it was seen that the keen frost had affected the metal and robbed it of its toughness and elasticity. That molder never worked on a foundry floor again.

Oxide of iron in the form of rust reacts with explosive effect in contact with molten iron. A young man known as Fanny does not need to be told this truth. Fanny had golden hair with a natural wave in it, blue eyes, finely chiselled features and a fair skin. Dressed in female clothing he easily could have passed for a girl. Already at 18 he had the reputation of a ladies man. His harmless tricks and humorous talk made him popular in the foundry. He had won prizes in the local dancing competitions. One winter's night, along with other fellows standing near the cupola, we indulged in many of the familiar foundry jokes.

As the white hot metal ran down the furnace spout into the steel ladle his eyes sparkled. He laughed heartily at the jokes and answered at times in a good humored manner. He had started a rumor that ran round the foundry that he was going to masquerade as a girl at a local beauty contest later in the evening. He nearly succeeded in making some of us believe the story, so convincingly did he answer all questions.

About 3 tons of iron had flowed in the ladle when Fanny remembered he had a feeding rod to warm. He darted toward the wall, grabbed a rod reared against it and then turned round to the ladle of sizzling iron. In daylight the coating of red rust easily would have been noticed, but watching the livid metal spill into the ladle had temporarily blinded all the men to any other color.

His mind for the moment was off his work. With a wise crack still on his lips he plunged the rusty rod in the ladle. Instantly a succession of sharp explosions followed, like the crackling of a machine gun as the rod entered the liquid iron. Geysers of mold metal shot up into the cold December air with terrific force. Fanny's face stopped some of the white hot shots. A smell of burning flesh filled the air as he staggered backward with his hands to his face. When he was discharged from the hospital some months later they told him they were pleased with what they had been able to do for him. But ever after, his scarred face and glass eye were not nice to look at.



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activities of foundry groups

Pittsburgh

ALL types of sand, binders and facings came in for a complete discussion at the November meeting of Pittsburgh Foundrymen's Association held Monday, Nov. 16. Day E. Cutler, sales manager, J. S. McCormick Co., presented a discussion on the practical application of sands, binders and facings in producing good castings. He laid particular emphasis on the performance of these various factors at high temperatures. Various types of blackings and other facings were discussed; their reactions, and their effects on iron, steel, malleable and nonferrous castings of various sizes and sections were covered thoroughly, based on research work and shop practice.

Harry W. Dietert, Harry W. Dietert Co., Detroit, presented colored movies showing actual behavior of sand mixtures in a dilatometer furnace at 2500 degrees. He also showed castings with defects caused by various conditions of sand molds and cores.—*Robert L. Hartford.*

Chicago

BECAUSE conditions vary widely and no two installations are alike, it is virtually impossible to predict what service is to be expected from refractories used in the foundry. A working knowledge of the chemistry of refractory materials will assist greatly in choosing the types which theoretically promise the best results. This was the contention of A. R. Blackburn, research engineer, Ohio State Engineering Experiment station, Columbus, O., in addressing the Chicago Chapter of the A.F.A. at the Chicago Bar Association, Dec. 7.

Confining his discussion almost entirely to the silica-alumina, or sand-clay, types used widely for lining cupolas, furnaces and ladles, and purchased as commercial mixes or hand mixed in the foundry, the speaker introduced his subject by explaining a series of diagrams representing the melting characteristics of silica and alumina when combined through the full range of proportions. It was carefully pointed out that commercial or shop mixes can not approach the ideal because of grain size. The ideal, upon which the diagrams were based, employed finely powdered materials.

Mr. Blackburn stated that when the silica and alumina are combined in any given percentage, the temperature required to raise them to the critical point at which they melt and unite chemically is several hundred degrees higher than the critical point of melting when reheated. The diagrams merely indicate the refractoriness of the mixes.

An extensive discussion period followed the speaker's presentation with S. E. McGinty, sales manager, Firegan Sales Co., Chicago, as leader. Many questions could not be answered specifically because not all of the variables were known. Mr. Blackburn emphasized that a mix giving good service in a specific job in one foundry frequently is quite unsatisfactory for what appears to be an identical use in another foundry. The difference is that all conditions encountered are not the same. Consequently, recommendations can only be made in a general way.

Much of the discussion centered around ladle linings in which the speaker said it is well to stay as high as possible on the alumina side in the mix. Ladle practice, he asserted, is not what is usually called severe.

As for basic practice, Mr. Blackburn warned that silica-alumina refractories, which are acid, should not be used. He suggested the chrome-magnesite type.

When questions got around to the compositions of various commercial mixes and their efficiency, Mr. Blackburn stated that the manufacturers base their products on years of experience and devise mixes scientifically. Foundrymen lack this experience and when they prepare their own mixes, they take over a job which commercial makers are well equipped to do.—*E. F. Ross.*

Wisconsin

MANPOWER problems were the principal topic at the war conference sponsored jointly by the Wisconsin Chapter of the A.F.A. and the Wisconsin State Chamber of Commerce at Hotel Schroeder in Milwaukee, Nov. 20. Gen. Lewis B. Hershey, head of the selective service system originally was scheduled to address the conference. However, since it was not possible for him to be present, his place on the program was taken by Maj. Ernest M. Culligan, Washington, public relations officer of the joint army and navy selective service system. His subject was, "This Manpower Problem". Those in attendance were permitted to submit questions in advance on the manpower problem to be answered by the speaker. This formed one of the most interesting features of the program.

Problems of industry, agriculture, business and the professions as they will be affected by the post-war period of adjustment were discussed by James Stuart Duncan, president, Massey-Harris Co. Ltd., Toronto, Ont., in his talk entitled, "After Victory, What?" Mr. Duncan has represented Massey-Harris company in several European and South American countries and displayed an intimate knowledge of present conditions and future developments that may be

Manpower problems were discussed at the Nov. 20 meeting of the Wisconsin Chapter of the A.F.A. On hand for the discussion, as shown from left to right, were Ben D. Claffey, General Malleable Corp.; Capt. D. D. Dupre, professor of naval science and tactics, Marquette University; Maj. E. M. Culligan, speaker, and George Dreher, Ampco Metal Inc., and president of the chapter. Photo courtesy of John Bing, A. P. Green Fire Brick Co., Milwaukee

expected in such countries when the war is concluded.

Fifteen new members have been added to the chapter this month, making a total of 55 new members since Sept. 1, according to Leon H. Decker, chairman of the chapter's membership committee. Chapter enrollment now is 470, or slightly under the 500 mark which has been set for the goal by Jan. 1. Present membership comprises: Sustaining, 16; company, 81; personal, 26; personal affiliate, 331; associate, 11; apprentice-student, 2; honorary and life, 3.—*George M. Pendergast, chairman, publicity committee.*

Cincinnati

TWO speakers were featured at the regular meeting of the Cincinnati District Chapter of the A.F.A. which was held at the Cincinnati Club, Nov. 16, with approximately 80 members and guests present. Frank E. Hutchinson, Reliance Foundry Co., Cincinnati, and chairman of the chapter presided. Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., talked on "Use of Scrap Iron in the Cupola". William Franck, Campbell-Hausfeld Co., Harrison, O., discussed, "Melting Nonferrous Alloys".

Immediately after dinner, Chairman Hutchinson opened a short business meeting during which he presented Robert E. Kennedy, secretary, the American Foundrymen's Association, who outlined briefly various activities of the association. The meeting then divided into two group sessions for discussion of ferrous and nonferrous problems.

Edgar O. Stamm, Buckeye Products Co., presided at the nonferrous session. There was considerable interest in Mr. Franck's discussion of melting practice and a spirited discussion followed. W. J. Buvinger, Buckeye Foundry Co., presided at the ferrous session. Mr. Kuniansky outlined his successful experience in using a high percentage of scrap in cupola melting. He promptly answered a number of questions in the subsequent discussion.—*Henry M. Wood, secretary.*

Northern California

PROBLEMS brought about by orders of various government war agencies were explained by members of those agencies in the San Francisco district at the Nov. 20 meeting of the Northern California Chapter of the A.F.A., held at the Engineers' Club, San Francisco. Ralph W. Browne, production and inventory analyst, who was unable to be present, had the subject he was scheduled to discuss covered by his ranking officer, A. Myers, consulting priority analyst, who explained the new controlled materials plan, and the transaction procedure involved in changing to that from the production requirement plan.

Duncan Low, price attorney, Office of Price Administration, stated that he felt especially adapted to talk to a group of foundrymen and their friends because he knew nothing about making castings. However, it was proved that he knew the business end of the game for which the government had picked him. E. W. Breidenback, price specialist for the regional Office of Price Administration, and guiding light for the nonferrous foundrymen, not only answered questions, but advised the brass foundrymen present that he would call a meeting soon to go over their problems. More than 130 were present which included several naval officers from the Naval Inspection Bureau. Two new members were added to the membership list.

A film on the reaction of sand under high temperature, prepared by Harry W. Dietert, Harry W. Dietert Co., Detroit, was presented before members of the Northern California Chapter of the A.F.A., Nov. 27. Alex Homberger, General Metals Corp., was the speaker of the evening, and after a preview of the film, discussed the reaction of sand to high temperature under varying conditions, and described what had been done by the A.F.A. sand control committee. He also covered methods used for various tests. A discussion period followed the film's presentation. Approximately 125 members and guests were present at the meeting, the second held during the month of November.—*George L. Kennard, secretary.*

Northeastern Ohio

WITH the ticket sale for the annual Christmas party of the Northeastern Ohio Chapter limited to the dinner seating capacity of the largest dining spot in Cleveland, the Rainbow Room of Hotel Carter, 1000 persons attended the dinner and floor show, on Thursday night, Dec. 10. In accordance with the spirit of the season, the piece de resistance was turkey, embellished with the usual gustatory accomplishments which make that fowl famous.

Dinner was underway promptly, and after a short interval in which Bob Robinson doubled in brass and entertained the boys with a few piano selections and songs, the floor show began at 8 o'clock sharp. Then for two hours those assembled were treated to the finest array of acts seen in these parts for many a day—or night. Grand finale was a spot-lighted display of the American flag with a rafter-ringing rendition of the Star Spangled Banner by the whole assemblage. Consensus of chapter members is that Bob Robinson, chair-

Harry Richey, the artist who draws the illustrations for Pat Dwyer's Bill story, prepared the above drawing for the announcement of the recent Christmas party of the Northeastern Ohio Chapter of the A.F.A. Can any of the Ohio gang recognize themselves in the drawing?

man of the entertainment committee, put on the best show in his career.—*Edwin Bremer, chairman of publicity.*

Southern California

AIRCRAFT industry's part in the war effort was discussed at the Nov. 19 meeting of the Southern California Chapter of the A.F.A., held at the Elks Club, Los Angeles. President Earl Anderson, Enterprise Iron Works, presided. The speaker Robert Monroe, director of materiel, North American Aviation Inc., discussed, "War Effort in the Aviation Industry". He stated our planes have proved the best in combat, as exemplified in attacks over the low countries of Europe. Although German planes attain high altitude, the marksmanship is sacrificed by that altitude. Our job is to continue making superb planes but faster production is required, which brings up the problem of material, the tough spot of the airplane plants. The motto among airplane manufacturers is, "We will gladly send a part to another company to get a plane off the ground today even though we will need the part tomorrow or next week." That co-operative spirit has been put into extensive practice in the Southwest with eight aircraft plants forming the Aircraft War Production Council Inc. Recently an additional organization called the East Coast Aircraft War Production Council Inc., was formed including eight Eastern factories also pooling their materials, engineering and resources to speed up take-offs. Foundrymen can well join up with this co-operative spirit in many ways.

Through the courtesy of Bell Aircraft Corp., Buffalo, the color, sound motion picture "Cannons on Wings" was shown, a most exciting and enlightening picture. W. F. Piper, Beardsley & Piper Co., Chicago, was a guest at the meeting.—*E. M. Hagener, secretary.*

New Jersey

MORE than 75 executives of foundries and foundry supply houses turned out to hear J. K. Lasser, senior partner, J. K. Lasser & Co., New York, certified public accountants, discuss income tax problems at a recent meeting of the New Jersey Foundrymen's Association. Mr. Lasser took up the question from the angle of the various forms of company organization—single ownership, partnership, corporation and closed corporation, and emphasized that the company with the most simplified form of organization was going to find in turn its tax problems the most simplified. However, he warned all to look for very complicated tax forms next year. An extended question-and-answer period followed his address.

With the new president, A. E. Winstead, presiding, announcement was made of the election of five directors for the ensuing 3-year term: J. Robert Campbell, Campbell Foundry Co., Har-

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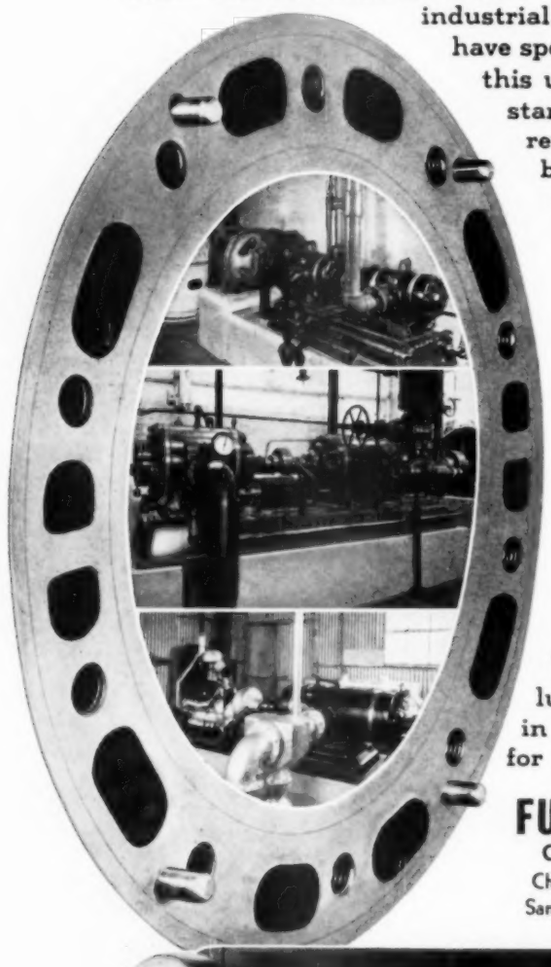

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rison, N. J.; John C. Phelan, Benjamin Eastwood Co., Paterson, N. J.; M. J. Hogan, Bierman-Everett Foundry Co. Inc., Irvington, N. J.; and P. R. Van Duyne, Meeker Foundry Co., Newark, N. J.; and Mr. Winstead, Moore Bros. Co., Elizabeth, N. J. All were re-elected except Mr. Hogan, who is a new member on the board.—*John C. Phelan.*

Philadelphia

WITH the largest attendance of any previous regular meeting, the Philadelphia Chapter of the A.F.A. met Nov. 13 at the Engineers Club, Philadelphia, and listened to an unusually interesting talk by Harold Morrison Smith, who is dean and co-principal, Bordentown Military Institute, Bordentown, N. J. Dean Smith's talk entitled, "Are We Worthy" was woven around the sacrifices being made by our troops in foreign lands and whether we at home are doing our part and are giving all our efforts as are the boys in the service.

Principal speaker, Stanley H. Bullard, Bullard Co., Bridgeport, Conn., was introduced by Technical Chairman John A. Sweeney. The topic was "Present Day Methods of Foundry Operation" and Mr. Bullard described various types of equipment used in the Bullard foundry. The membership was especially interested in the speaker's explanation of the method of charging three cupolas, particularly as to the practice of mixing coke, scrap, iron, etc. together in each charge, there being no attempt to keep these materials separate. This, Mr. Bullard said, meant a considerable saving in charging labor and the company was unable to see any difference in the melting rate and the quality of the iron produced. Upon completion of the talk, a lively discussion was held and with the assistance of James Coltman, superintendent of the Bullard Co., a number of interesting points were brought out.—*William S. Thomas, chairman, publicity committee.*

• • •

Ontario

CASTING defects were discussed by John L. Lowe, Battelle Memorial Institute, Columbus, O., and a member of the committee on analysis of casting defects of the American Foundrymen's Association, at the Nov. 27 meeting of the Ontario Chapter of the A.F.A. held at the Royal Connaught Hotel, Hamilton, Ont. C. C. MacDonald, Frederic B. Stevens Co. of Canada Ltd., and vice chairman of the chapter, presided, and J. A. Wotherspoon, Imperial Iron Corp., St. Catharines, Ont., served as technical chairman.

Mr. Lowe listed 36 casting defects which have been accepted by members of the committee on analysis of casting defects. The speaker then dealt with the definitions and causes of the first four types of defects which are as follows: Blows, gas holes, pin holes, blisters; scabs, buckles, rattails, pull down, blacking scabs; cuts and washes due to

gas and metal erosion; inclusions of sand, slag and other foreign materials. These four types of defects have been discussed in the *American Foundryman* by members of the casting defects committee who include: W. A. Hambley, Allis-Chalmers Mfg. Co., Milwaukee; L. E. Everett; E. J. Carmody, C. C. Kawin Co., Chicago; and W. B. McFerrin, Cadillac Motor Car Division, General Motors Corp.

An interesting discussion followed the presentation on certain types of foundry defects and Mr. Lowe received several suggestions to take before his committee. It was pointed out that it would be desirable if members of the chapter would study the reports on casting defects thoroughly and write to the committee when points arose with which they disagreed.

The meeting attracted the second largest attendance in the history of the chapter with more than 130 members and guests in attendance.—*George L. White, secretary-treasurer.*

Twin City

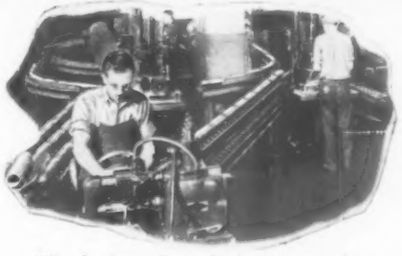
NOVEMBER meeting of the Twin City Chapter of the A.F.A. was held Nov. 16, at the Midway Club, St. Paul. Dinner was served to 74 members and guests. H. H. Blosjo, Minneapolis Electric Steel Castings Co., presided in the absence of Chairman Aker. To promote acquaintanceship it was announced before the group sat down to dinner that anyone found sitting next to anyone in their own organization would be fined. The roll call was made by firms and those found violating that order were required to buy war stamps as a penalty. The secretary then interviewed several members and considerable interesting information came to light, such as their age, how much of a family they had, how they happened to get in the foundry business and why they stayed in it. This all produced much fun.

Mr. Blosjo then introduced the speaker of the evening, B. P. Mulcahy, research engineer, Citizens Gas & Coke Utility, Indianapolis, who gave a splendid talk on the subject, "Cupola Operation". The talk was illustrated with slides and blackboard demonstrations.—*O. W. Potter, secretary.*

Metropolitan

SUBSTITUTION of one metal for another can be made successfully only when the job of the finished part is known, said Sam Tour, vice president, Lucius Pitkin Inc., New York, in addressing a group of 80 members and guests at the Dec. 7 meeting of the Metropolitan Chapter of the A.F.A. at the Essex House, Newark, N. J., on the subject, "Substitutions for Critical Foundry Alloys".

Mr. Tour emphasized that substitutions should not be made by economists but by designing engineers who know metals. Three important factors which



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must be considered in substitutions were given as: Difference in physical properties; difference in fabricating properties; availability of substitute. The designer in considering a change of metal for a casting should contact first his source of supply, then the machine shop and the plating shop to make sure that the substitute he has in mind will meet their requirements. Mr. Tour listed 24 different properties of metal which the designer must consider in selecting the best substitute.

The speaker stated it is surprising that the gray iron foundry industry is not more active in replacing aluminum castings and indicated that this condition also is true of the malleable iron industry. He stressed the fact that it is the responsibility of the foundrymen to provide engineering colleges with information on castings which will give the graduate a clear picture of the function and usefulness of cast metals. As a typical example where the foundry industry had not taken on responsibility of providing students with information, he cited the instance of many young designers that 88-10-2 bronze be used where 88-8-4 might properly be substituted. Likewise he referred to the stress which is put upon use of high purity aluminum alloys where secondary aluminum often is as satisfactory. Mr. Tour suggested the following as possible substitutes in different types of nonferrous castings: For aluminum base sand castings — secondary aluminum, copper-silicon alloy, cast steel, malleable iron, gray iron, yellow brass; for brass castings—copper-silicon alloy, low copper bronze, gray iron, malleable iron, steel castings; for bronze castings—88-8-4 is the proper substitute for 88-10-2; for nickel silver castings—leaded red brass (plated), low tin bronze, copper-silicon alloy, yellow brass, gray iron, malleable iron, steel castings.

Following the meeting, the group divided into individual groups to discuss substitution problems pertinent to various classes of metals cast in the foundry.—*K. A. DeLonge, secretary.*

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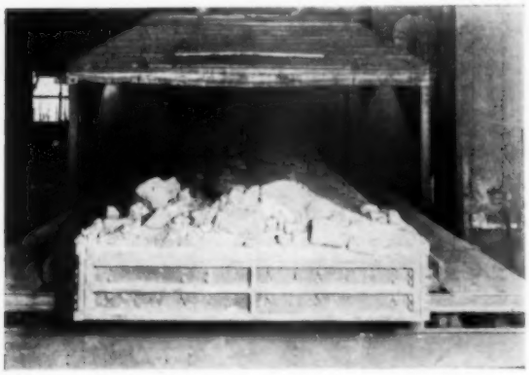

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St. Louis

THE place of the cupola in steel castings production today was the topic discussed by A. W. Gregg, Whiting Corp., Harvey, Ill., at the Nov. 12 meeting of the St. Louis District Chapter of the A.F.A. at the DeSoto Hotel. C. B. Shanley, Semi-Steel Casting Co., and chairman of the chapter, presided. He announced that more than 50 per cent of the chapter's cupola research fund had been raised. Walter Zeis, Midwest Foundry & Supply Co., and chairman of the membership committee, introduced five new members.

Mr. Gregg, who is executive engineer of the equipment division, Whiting Corp., gave a brief outline of the growth in size and the length of hours run continuously in the past several years. He also covered thoroughly the theory behind cold blast, hot blast and dry blast cupolas. Mr. Gregg included in his talk a description of the cupola's use in duplex and triplex operations and its use in connection with the converter. His discussion was concluded with a motion picture of a duplexing system in operation in a large steel plant in the St. Louis district.— *J. H. Williamson, secretary-treasurer.*

Quad-City

A JOINT meeting of the Tri-City Chapter of the American Society for Metals and the Quad-City Chapter of the A.F.A., held Nov. 16 at the LeClaire Hotel, Moline, Ill., with 135 present, was addressed by Fred A. Melmoth, vice president, Detroit Steel Castings Co., Detroit. Alex Matheson, French & Hecht Inc., Davenport, Iowa, chairman of the A.F.A. chapter, and Gordon T. Williams, Deere & Co., a member of the A.S.M. served as chairmen of the meeting. Mr. Melmoth gave an excellent illustrated address on "Steel Castings". In confining his talk to physical properties obtainable while conserving alloys, he outlined various types of heat treatment and drawing for cast steel to meet speci-

fications now in use. A lively discussion was enjoyed following his presentation.

The annual Christmas party of the Quad-City Chapter of the A.F.A. was held at the Blackhawk Hotel, Davenport, Iowa, Dec. 11. Approximately 345 members and guests were present to enjoy the dinner and variety entertainment. Chairman Alex Matheson, French & Hecht Inc., Davenport, Iowa, presided. Special program committee for the meeting included: A. H. Putnam, J. H. Ploehn, Alex Matheson, B. O. Collins, H. L. Creps, J. C. Gore, C. E. VonLuhrte, J. Morgan Johnson, C. F. Burgston, and Martin Liedtke.

Next meeting of the chapter will be held Jan. 18 at the Fort Armstrong Hotel, Rock Island, Ill. W. G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J., will discuss "Sand Control".—*H. L. Creps, recording secretary.*

New England

REGULAR monthly meeting of the New England Foundrymen's Association was held at the Engineer's Club, Boston, Dec. 9. After dinner, President Raymond Meader appointed a nominating committee consisting of R. F. Harrington, Hunt-Spiller Mfg. Corp., E. H. Ballard, General Electric Co., and W. A. Saunders Jr., Walter A. Saunders Co. to nominate officers to serve for 1943.

Mr. Meader then introduced George S. Evans, metallurgist, Mathieson, Alkali Works, Inc., New York, who discussed, "Cupola Fluxes and Slags". The speaker explained that any substance added in a cupola charge in order to form a more fluid slag was termed a flux. He stated that fluxes, beside decreasing the viscosity of a normal cupola slag, tend to check silicon pick-up and accelerate combustion. Of the common fluxing agents, limestone, dolomite and fluorspar are the most important. Commercial limestone containing 96 per cent calcium carbonate is as good as pure limestone for the purpose. Fluorspar liquifies the slag but does not reduce sulphur. Purite or soda ash, which is about 88 per cent sodium carbonate, is an active agent in reducing sulphur.

All fluxes should be bought under specifications as to size as well as analysis. If a flux is too fine, much of the material is blown out the cupola stack and hence is ineffective. Large stones are of no value until they break down. Average or usual amount of limestone used is about 48 pounds per ton charged.

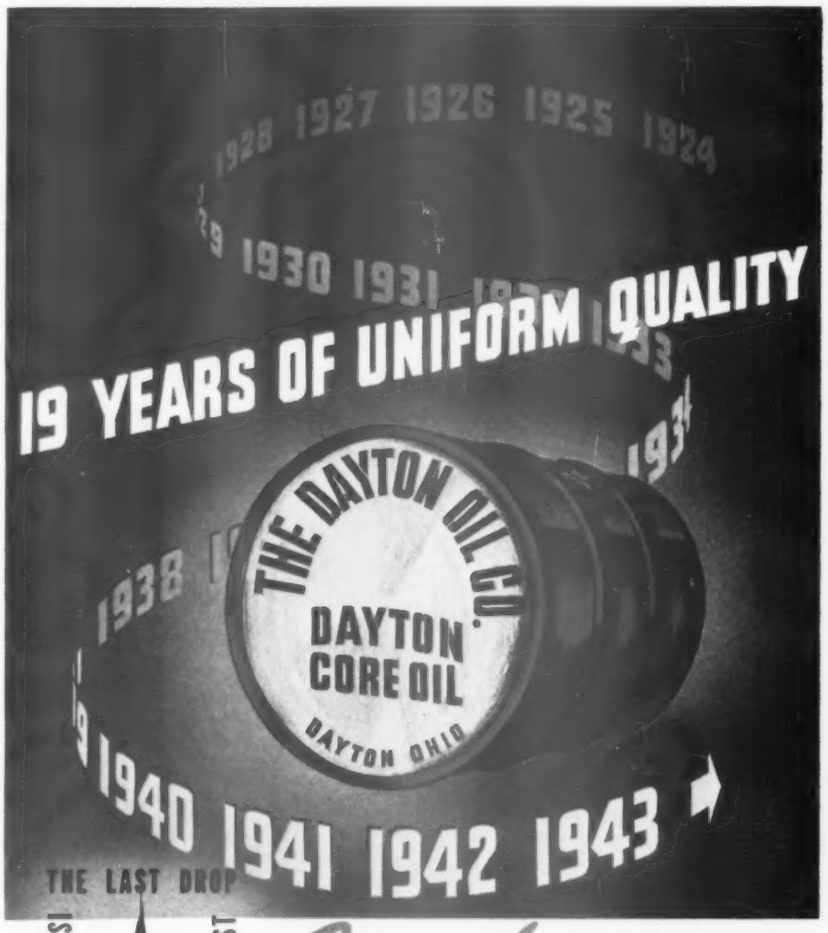
A basic slag is one in which the calcium oxide ratio exceeds the silicon dioxide ratio and conversely an acid slag is one in which the silicon dioxide ratio is larger. Neutral slag is one in which the ratio of silicon dioxide to calcium oxide is one to one. It is impossible to desulphurize with an acid slag. In cupola operations, a basic slag is more oxidizing. Purite is added in amounts of 4 pounds or more per ton charged to keep the cupola clear and effect a sulphur reduction. Slag must be absent to bring about sulphur reduction. In cupola operations, a reduction in sulphur pick-up usually is accomplished rather than a reduction of sulphur. A lengthy and interesting discussion followed the address. Approximately 75 members and guests were present.

Annual business meeting and election of officers will be held Jan. 13, and an entertainment program will replace the usual speaker.—*Merton A. Hosmer*

Detroit

ANOTHER record turnout was on hand for the Nov. 19 meeting of the Detroit Chapter of the A.F.A., 116 being present for dinner and an additional 35 participating in the ensuing roundtable discussions. Following a choice turkey dinner, the chapter heard brief remarks from Robert E. Kennedy, national secretary of the A.F.A., and an entertaining coffee talk by Ralph L. Lee, public relations expert for General Motors Corp., who spoke colorfully on the subject "Human Engineering".

The meeting then divided into four



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groups for roundtable discussions on heading and gating of steel castings; materials handling operations in gray iron foundries; trimming and cleaning of aluminum castings; and the casting of silicon bronzes.

The aluminum meeting, in charge of W. G. Mixer, Buick Motor Division, with A. W. Stolzenburg, Aluminum Co. of America, group chairman, drew the largest crowd, which was not surprising in view of the expert job which Mr. Mixer has done in connection with the new Buick aluminum foundry in which airplane cylinder heads are produced (see THE FOUNDRY, December, p. 66).

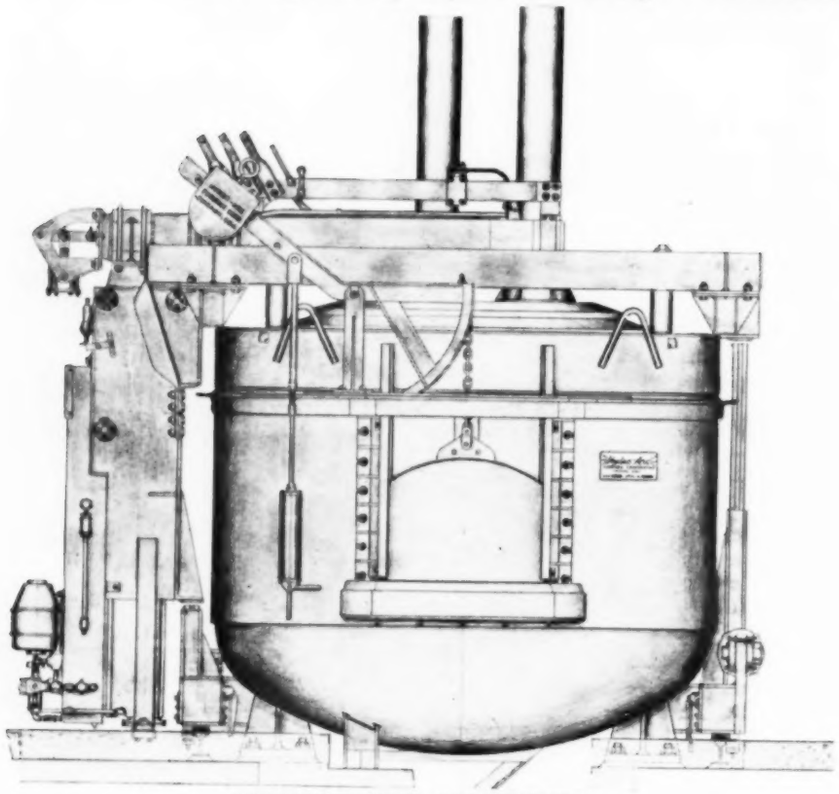
The discussion at the steel castings roundtable was introduced by comment prepared by F. A. Melmoth, Detroit Steel Casting Co., and read in his absence by C. E. Silver, Michigan Steel Casting Co., chairman of the group.

Omer Allen, Pontiac Motor Division, and vice chairman of the chapter, directed the discussion at the gray iron roundtable which was under chairmanship of Edward C. Hoenicke, Eaton Mfg. Co.

Discussion of silicon bronzes, now replacing tin bronzes, was arranged by J. B. Carritte, True Alloys Inc., and featured comment by H. E. Pefferly, Phelps-Dodge Corp.

According to custom the chapter held no meeting in December, but will resume regular meetings in January, on the 21st, with another series of four roundtable discussions on phases of foundry practice.—*A. H. Allen, secretary.*

★HYDRO-ARC ELECTRIC FURNACES are speeding Steel Foundry Production



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The above HYDRO-ARC electric furnace shows some of the improvements in our equipment.

USES low inertia air for counterbalancing the electrodes to cooperate with a simple, accurate hydraulic control, to position each electrode. The few moving parts of this combination have *no stretchable steel cable nor limit switches to watch.* Low up-keep—less surging — less electrode — and more metal at low cost. This furnace features water-cooled electrode arms and heavy plate mica electrical insulation *away* from the heat. *Power-operated electrode clamps keep the men off the top of the furnace.* The electrodes are slipped from the floor.

HYDRO-ARC

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Adventures of Bill

(*Concluded from page* 104)

The size of the pot possibly may be a factor in your excessive loss. Have you noticed whether the loss is uniform, or is confined to the last molds poured? For yellow brass a temperature of 2100 degrees Fahr. is high enough. However, you must allow for the fact that metal loses temperature rapidly after it leaves the furnace, especially where only a few pounds are poured into each mold. The sand may be too damp, or may be rammed too hard. Either one of these features will take the life out of the metal and prevent it from running a maximum distance.

"The photograph which accompanied your letter shows a large rectangular sprue, a fairly heavy runner in the cope and six small gates leading to each mold cavity in the drag. These gates are entirely too small. They divide the metal into many small streams with a resulting loss in temperature. Two alternative types of gates should prove more satisfactory. The first is your present style of sprue and runner. Instead of the present narrow gate entrances to the casting, spread them out so that they form a practically continuous opening. The second method, provided the sand around the sprue opening is rammed properly and slicked, is preferable, if for no other reason than that it takes less metal. This is a plain wedge gate set directly on top of each pattern. The wood gate patterns remain in the cope when it is lifted off. A slick is drawn across the sand on each side where the gate touches the pattern. This is to stiffen the sand and prevent it from washing away with the metal stream. The metal is poured rapidly into one sprue after the other, or it could be poured from two pots. If the customer has no objection, a few ounces of aluminum added to the metal in the pot will improve the running property."

Problems of the better lighting in both manufacturing and service industries to meet wartime demands for increased production, improved products and greater safety and comfort for workers will be studied by the newly organized Industrial and Commercial Lighting Equipment Section of the National Electrical Manufacturers Association, according to an announcement by its chairman, E. C. Huerkamp, manager, Lighting Sales, Westinghouse Electric & Mfg. Co., Cleveland.

National Founders Association

ELECTS NEW OFFICERS

ADMINISTRATIVE council of the National Founders Association recently met at the Waldorf-Astoria, New York, to receive the report of the nominating committee and transact other business. The report of the nominating committee received the unanimous approval of the council and was submitted to the members for letter ballot. This method of election was made necessary because of the decision of the members not to hold the regular meeting in 1942, due to pressure of war work. Don C. Bakewell, Blaw-Knox Co., Pittsburgh, was elected president, succeeding William D. Hamerstadt, Lockwood Mfg. Co., Indianapolis. Fred H. Clausen, Van Brunt Mfg. Co., Horicon, Wis., was named vice president to succeed Mr. Bakewell, and J. M. Taylor, 120 South LaSalle street, Chicago, was re-elected secretary and treasurer.

With Mr. Hamerstadt presiding, an alumi dinner was held in the evening of the day of the council meeting with over 30 present. In discussing various aspects of the Washington scene, James A. Emery, senior counsel, National Association of Manufacturers and an honorary member of the alumni group, predicted a resurgence of independence in Congress as a result of the recent elections. Despite difficulty of various iron foundries engaged in light bench work in obtaining sufficient war work for profitable operations, the association showed an actual gain in membership over the past year, and reported finances in excellent shape.

Discussion revealed that many companies have been able to obtain war work, and in so doing have swung over to work quite foreign to usual lines of production. The engineering staff of the association is proving of valuable assistance to members making these necessary transformations it was stated. Steel foundries continue fairly deluged with war work.

A. E. McClintock, Chicago, long commissioner of the association, was re-appointed for the ensuing year.

First district, New England states: Franklin Farrel 3rd, Farrel-Birmingham Co., Ansonia, Conn.; A. M. Cottrell Jr., C. B. Cottrell & Sons Co., Westerly, R. I.; W. W. C. Ball, Taylor & Fenn Co., Hartford, Conn.; Howard A. Stockwell, Barbour Stockwell Co., Cambridge, Mass.; Henry C. Griggs, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Second district, New York and that part of New Jersey north of a line drawn from Lambertville to Point Pleasant and the provinces of Ontario and Quebec in the Dominion of Canada: Hamilton Garnsey Jr., Goulds Pumps Inc., Seneca Falls, N. Y.; C. P. Clark, Clark Bros. Co., Olean, N. Y.; J. H. Hornung, Otis Elevator Co., Yonkers, N. Y.; C. W. Pearson, Buffalo Foundry & Machine Co., Buffalo; G. W. Hannay, Barnett Foundry & Machine Co., Irvington, N. J.

Third district, Pennsylvania, Delaware, Maryland, District of Columbia, and that part of New Jersey south of a line drawn from Lambertville to Point Pleasant and including these two towns: George R. Casey, Treadwell Engineering Co., Easton, Pa.; D. J. Peake, Florence Pipe Foundry & Machine Co., Florence, N. J.; Edward C. Moore, Erie City Iron Works, Erie, Pa.; James S. Ervin, Mackintosh-Hemphill Co., Pittsburgh; R. S. Munson, Atlantic Steel Castings Co., Chester, Pa.

Fourth district, the lower peninsula of Michigan, Ohio, Kentucky, Indiana, and West Virginia: R. W. Gillispie, Jeffrey Mfg. Co., Columbus, O.; I. R. Wagner, Electric Steel Castings Co., Indianapolis; John M. Price, Ferro Machine & Foundry Co., Cleveland; Eugene A. Leary, Cincinnati Steel Castings Co., Cincinnati; R. G. Wilson, Challenge Machinery Co., Grand Haven, Mich.

Fifth district, Illinois, Missouri, Oklahoma, Kansas, Nebraska, Iowa: E. L. Berry, Link-Belt Co., Chicago; Ira G. Whitney, A. Y. McDonald Mfg. Co., Dubuque, Iowa; C. N. Stone, Deere & Co., Moline, Ill.; George P. Fisher, Whiting Corp., Harvey, Ill.; Edward B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill.

Sixth district, Wisconsin, Minnesota, upper peninsula of Michigan, North Dakota, South Dakota, and the province of Manitoba, Canada: H. O. Menck, Harnischfeger Corp., Milwaukee;

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Come out and see us building Hydro-Arc Electric Furnaces. Look at our *accurate, fast, hydraulic controls* and *power-operated electrode clamps* — fast — close control — keeps the men off the furnace.

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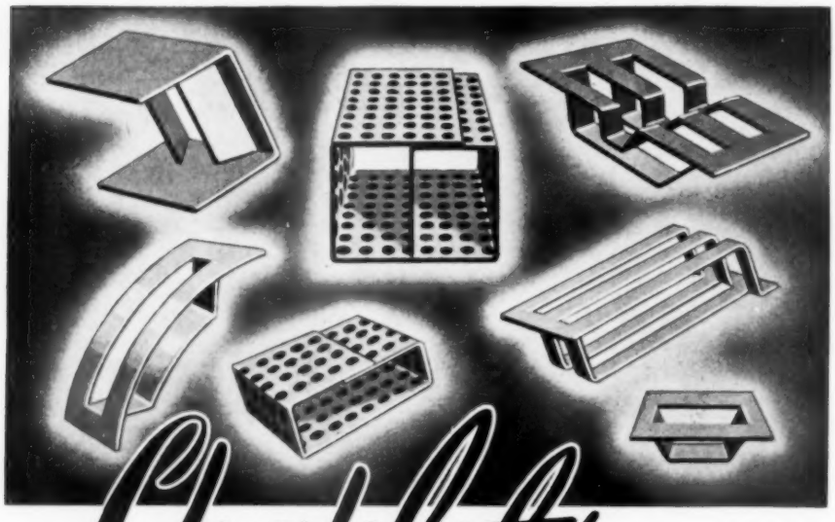
George E. Long, Kochring Co., Milwaukee; Harold S. Falk, Falk Corp., Milwaukee; J. D. McDonald, Vulcan Iron Works, Winnipeg, Manitoba; E. H. Neese, Beloit Iron Works, Beloit, Wis.

Seventh district. Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Texas and Tennessee: John D. Capron, Glamorgan Pipe & Foundry Co., Lynchburg, Va.; W. C. Trout, Lufkin Foundry & Machine Co., Lufkin, Tex., Warren Whitney, James B. Clow & Sons, Birmingham, Ala.; H. A. McLellan, General Fire Extinguisher Co., Atlanta, Ga.; H. W. Anderson, U. S. Pipe & Foundry Co., Chattanooga, Tenn.

Past presidents of the association include: Thomas S. Hammond, Whiting Corp., Harvey, Ill.; S. Wells Utley, Detroit Steel Casting Co., Detroit; Thomas W. Pangborn, Pangborn Corp., Hagerstown, Md.; Franklin R. Hoadley, Atwood Machine Co., Stonington, Conn.; William D. Hamerstadt, Rockwood Mfg. Co., Indianapolis, Ind.

Two castings of 142 tons each recently were transported across the United States traveling upright on special cars at specified speeds of 8 to 10 miles on curves and 15 miles on straight-a-ways, to be used in the equipment for a new aluminum rolling mill at Spokane, Wash. The castings were produced by the United Engineering & Foundry Co., Youngstown, O.



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Metal Makers Guild Plans Regional

Plans for a regional conference to be held in Chicago next March are being made by the Electric Metal Makers Guild Inc. Ground-work for the event was laid at a meeting of the Chicago section of the Guild with national officers at the Union League Club, Chicago, Saturday, Dec. 5.

Herman Schultz, superintendent of electric furnaces, South Works, Carnegie-Illinois Steel Corp., Chicago, heads a committee appointed to arrange for the conference and prepare the program. Other members of the committee are A. J. Scheid Jr., metallurgist, Columbia Tool Steel Co., Chicago Heights, Ill., and B. J. Aamodt, superintendent, National Malleable & Steel Castings Co., Cicero, Ill.

The Chicago section meeting last week, attended by more than 20 members in Chicago area and adjacent territory of the midwest, was conducted with Burt W. Reynolds, melting foreman, Burnside Steel Foundry Co., Chicago, and head of the Guilds Chicago section, as chairman. Discussed at length at afternoon and evening sessions was the organization's policy and program for next year. Following this, a forum was held on shop problems and the general conditions in the electric melting field. Topics included manpower shortage training programs, scrap and other materials shortages, furnace operation and melting procedures such as duplexing and triplexing.

Organized for ten years with sections in Pittsburgh, New York, and Chicago, but functioning more or less quietly, the Guild is adopting a new policy of giving publicity to its work to give assistance to the war effort. First evidence of this was a sectional meeting in Pittsburgh, Oct. 31. It is pointed out that electric furnace capacity now operating or in process of installation is approximately triple the capacity before the advent of war. This is introducing the important problem of obtaining and training a sufficient number of furnace operators.

Harry F. Walther, electric furnace superintendent, Timken Roller Bearing Co., Canton, O., is national president of the Guild. James Sweitzer, superintendent, Sivyer Steel Casting Co., Milwaukee, is vice president; and John E. Arthur, superintendent of melting, Park Works, Crucible Steel Co. of America, Pittsburgh, is secretary-treasurer.

Annual convention of the Guild will be held at the Onesto hotel, Canton, O., June 4-5.

TRAINING WORKERS

Within Industry

By JOHN H. GREENLAND
Training Specialist
Training Within Industry
Cleveland

MANPOWER was not a problem when the clarion call came for industry of this country to go on a war basis. To all lay observers, manpower was sufficient. In fact the war needs would take up the slack in the national unemployment problem. However, in the past 10 months, Selective Service has taken a large part of the trained personnel and industry has expanded beyond the wildest dreams of the most enthusiastic industrialists. Because of those two facts, the nation now is faced with an acute manpower shortage.

What of manpower? Estimates indicate that we, as a nation, will have sufficient manpower to perform the herculean task before us, only if we conserve our present manpower resources and utilize them to the fullest extent of their capacities. This will bear fruit only after non-war employes have been converted to war workers through training, and approximately five million additional women are recruited and trained for the war effort. Obviously, training programs more gigantic and intensive than ever before contemplated are necessary since manpower to do these jobs cannot be found, but must be trained.

Specialists Offer Advice

The government realizing that training on such mass proportions cannot be undertaken by individuals, has created an agency called Training Within Industry. This agency is staffed with men from industry who are fully cognizant of the needs of present day management. On the staffs are trained specialists who can offer expert advice on setting up training programs, conversions of jobs to female labor, in-plant, on-the-job or vestibule training, upgrading, supervisory training, personnel programs and labor relations programs. To date the record set by Training Within Industry as a helpful agency, without cost to industry, has been phenomenal. Such feats as converting a 100 per cent male manned plant over to 60 per cent female workers; or reducing job training time from an original eight weeks to one week are becoming commonplace. A hundred thousand supervisors, covering an entire organization chart from president down to leadman, have had Job Instructor Training and are far better supervisors, doing a much improved job in our war effort.

Industry has acclaimed the Job Instructor Training of the agency as it produces the quickest results to management. As most executives realize, the best mechanic or skilled technical man is not always the best instructor. Job Instructor Training gives the supervisor four basic steps on how to impart his knowledge to the new male or female employes. This is a short 10-hour course given in five 2-hour sessions. Reports from companies show a marked improvement in production the week following the completion of the sessions. The list of industries covered by this branch of Training Within Industry reads like a blue book of manufacturers. It can be foundry, steel mill, ordnance, electrical instrument, food or woodworking plant and a case history will be in the files showing that help has

So well have Hydro-Whirl Dust Collectors demonstrated the high efficiency of trapping dust that their performances have attracted the attention of many renowned chemical engineers.

The extraordinary effectiveness of the Hydro-Whirl in dust control—proved by exhaustive tests and in practical use in scores of war plants — distinguishes these units from ordinary dust collectors, and makes them particularly valuable wherever magnesium dust is a factor. Authorities agree that ordinary dust collectors have very little success in coping with the inherent hazards of magnesium alloys.

The efficiency of Hydro-Whirl on magnesium recommends the use of the same principle on other types of metal dust, such as aluminum, iron, and steel.

Units are available for either stand grinding or flexible shaft grinding; in single, double, or greater multiples.

We shall be glad to discuss any dust control problems with your engineers.

Photo by Courtesy of Aluminum Industries, Inc.

Industrial

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been given to the plant which requested it. Size of plants using the service include an aircraft company with 25,000 employes and a tool and die shop with 40 employes. Any and all plants will be given aid. The only thought is to increase production and bring this war to a speedy and victorious end.

Is your plant suffering from any of the following:

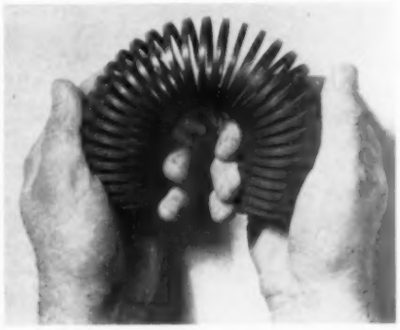
Need of in-plant training?
Need of on-the-job training?
Need of supervisory training?
Need of induction program?
Need of up-grading program?
Conversion of female workers?
Need of labor relations program?

If so, contact your nearest Training Within Industry office and the experience of hundreds of industrialists will be at your disposal.

Shows Flexibility Of Cast Iron

Since all materials are flexible to a certain degree, brittleness is only a relative term according to a demonstration at the Copper-Bessemer Corp., Mount Vernon, O. Under pressure of war work, the firm turned to cast iron crankshafts for its large diesels to supplement the use of forged steel for that purpose. Although performance and laboratory tests established that Meehanite cast iron was flexible to a relatively high degree, officials of the firm desired a more graphic demonstration of that property.

For that purpose a piece of metal from one of the castings was cut in such a way that it formed a helix about 10 inches long and 2 inches in diameter as



shown in the accompanying illustration. The helix or spring can be bent double or elongated and returns to its original shape each time. Crankshafts of the cast iron ranging from 3 to 9½ inches in diameter have been in actual service for six years according to Ralph Boyer, chief engineer of the Cooper-Bessemer Corp., and have been performing with entire satisfaction.

Fire Extinguishers Must Be Conserved

Since practically the entire output of approved fire extinguishers is being taken by the Army, Navy and manufacturers with top priority ratings, other users are finding it nearly impossible to obtain new extinguishers. Recharging materials and replacement parts still can be purchased without difficulty and as long as that condition persists, existing equipment readily can be kept in service. With proper servicing, equipment will last indefinitely.

The following are a few simple rules for keeping extinguishers in service for the duration:

Place a man in charge of recharging and inspection upon whom you can depend to see that directions are followed to the letter.

Provide him with recharging materials and replacement parts supplied by the manufacturer of the extinguishers.

Give him a place to work where plenty of hot and cold water are available.

Give him the tools he needs—buckets, mixing sticks, vaseline to place in the threads of the heads of the 2½-gallon extinguishers, etc.

Then, hold him strictly accountable for the quality of his work, which will be reflected in continuing good performance of the extinguishers.

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CHICAGO, ILL.

Considers Solution of

MULTIPLE SHIFT PROBLEMS

By NATHANIEL KLEITMAN
Department of Physiology
University of Chicago

PRESENT emergency has necessitated employment of two or three, or even four shifts, in carrying out the President's request to keep plants going 24 hours a day, 7 days per week. Introduction of multiple shifts has brought up a number of problems with respect to work at unusual hours and the necessity of adapting one's other daily activities to the new schedule.

When a night worker complains of his inability to sleep well in the daytime, he unintentionally conveys the information that he is very sleepy at night, when he should be wide-awake at his bench or machine. This is because sleep and wakefulness are mutually complementary, constituting the two phases of the cycle of existence, like the trough and crest of a wave. Sleepiness of the unhappy night worker is due not only to his working during the customary hours of sleep, but also to the fact that he slept poorly the day before.

At birth we spend most of our time in sleep, and there is no evidence of any 24 hour cycle in our bodily activities. However, we are born into a world which is run on the routine of day-time work, evening leisure, and night sleep, and we very early in life are subjected to an enforced schedule of hours in conformity with the habits of our elders. As a result, already in the second year of life we have a well-established 24 hour or diurnal cycle of existence.

Instead of a normal body temperature, we have a temperature range, varying for different people and for the same person at different times. This range is about one, two, or even three degrees Fahr. over a 24 hour period and the change in body temperature from hour to hour is such as to create what we call a 24 hour body temperature curve. Under ordinary routine conditions of existence, the peak or plateau of the temperature curve is reached some time during the afternoon, usually between 1:00 and 7:00 p.m. At that time our efficiency is greatest. The minimal body temperature is reached during the early morning hours, somewhere between 2:00 and 5:00 a.m. If one stays awake overnight, those are the hours of worst inefficiency and greatest difficulty of remaining awake. When one adjusts himself to a new routine of existence, with other than customary hours of sleep, work, meals, and leisure, one gradually acquires a body temperature curve, with the highest efficiency and less sleepiness during the new activity hours and just the opposite during the new sleeping hours.

A variety of physical and mental tests have demonstrated that hardly anyone is at his best immediately on waking up in the morning. In fact, performance at that time may be as poor or poorer than just prior to going to bed the night before. However, from this low level of performance, one shows a gradual improvement reaching a peak or plateau of greatest efficiency sometime between noon and evening. Beyond that, efficiency again falls off, and at a certain hour, in people with regular habits, a state of drowsiness develops, and the individual usually retires at that time. If, however, one is kept awake during the entire night, he will show an increased progressive drop in performance between 2:00 and 5:00 a.m., but from then on will show an upward turn so that at the time of his usual awakening,

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The smooth, true wheel rotation of every Marschke assures steady contact between wheel and work. Correct rate of wheel surface travel during all stages of wheel wear assures fastest production with genuine wheel economy. Extra conveniences contribute to speed of operation. Marschke's meet every foundry requirement.

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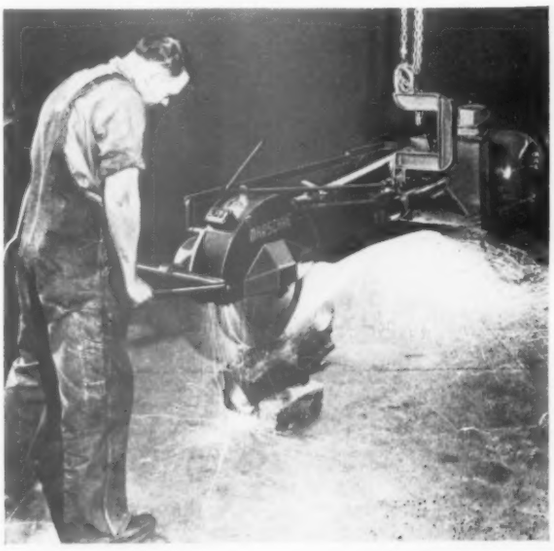


"Laboratory view" of a Marschke Swing Frame Grinder undergoing tests for study of spark action. Shields protect joints, belt and motor from the sand blast effect of sparks and grit to which vital parts of ordinary swing frames are subject. Notice how elimination of outboard bearings gives the operator a clear view of the work area.

MARSCHKE QUALITY GRINDERS AND BUFFERS

VONNEGUT MOULDER CORP. INDIANAPOLIS

his performance will be nearly as good as it was at the bedtime the night before. Because the 24 hour cycle of sleep, work, meals, and leisure is not inborn, but individually developed by following a definite routine, it can be displaced forward or backward by faithfully following a new routine.

The application of these facts to the solution of the multiple shift problem has two aspects: (1) rotation or maintenance of shifts and (2) shift distribution or timing.

(1) It takes several weeks for a new 24-hour sleep-work-meals-leisure cycle to be properly established. Such achievement is wholly impossible under the system which prevails in some establishments of weekly or biweekly shift rotation, because the individual is not given a chance to adapt himself to a new routine. He essentially remains on the customary cycle of daytime work and night-time sleep. This makes him dislike work at odd hours. It causes him to be sleepy at a time he should be wide awake and wakeful when he should be sleeping; it leads to a decrease in production rate and a greater tendency to accidents. The way to overcome this effect is to keep each worker on a given shift for extended periods of time. Since rotation of shifts is very often adopted as a measure of fairness to all workers, the principle of equality of treatment can be preserved by having the workers change shifts once in several months, instead of weeks, or even days. The change in shifts can be staggered and made to coincide with short periods of vacation, in line with the suggestion that vacations should be distributed around the entire calendar year, instead of concentrated during the summer months. Where the workers themselves prefer it, the maintenance of "steady" shifts, with no rotation whatsoever, can be accomplished with due regard to seniority rights. Whether the shifts are "steady" or rotated, some effort should be made to modify community life to the extent of making leisure activities at other than customary hours possible.

(2) It is clear enough that a person working from midnight to 8:00 a.m., which is the customary night shift, makes his new work period coincide almost completely with his old sleep period. It is easier to adjust one's self to another shift timing in which the displacement of the cycle is smaller. Taking, for example, three eight-hour shifts, the following is suggested:

Red (Sunset) shift. Working hours from noon to 8:00 p.m. Evening and early night free for leisure activities. Sleep from 1:00 or 2:00 to 9:00 or 10:00 a.m.

White (Victory) shift. Working hours from 8:00 p.m. to 4:00 a.m. Sleep from about 5:00 a.m. to 1:00 p.m. Afternoon and early evening free for leisure.

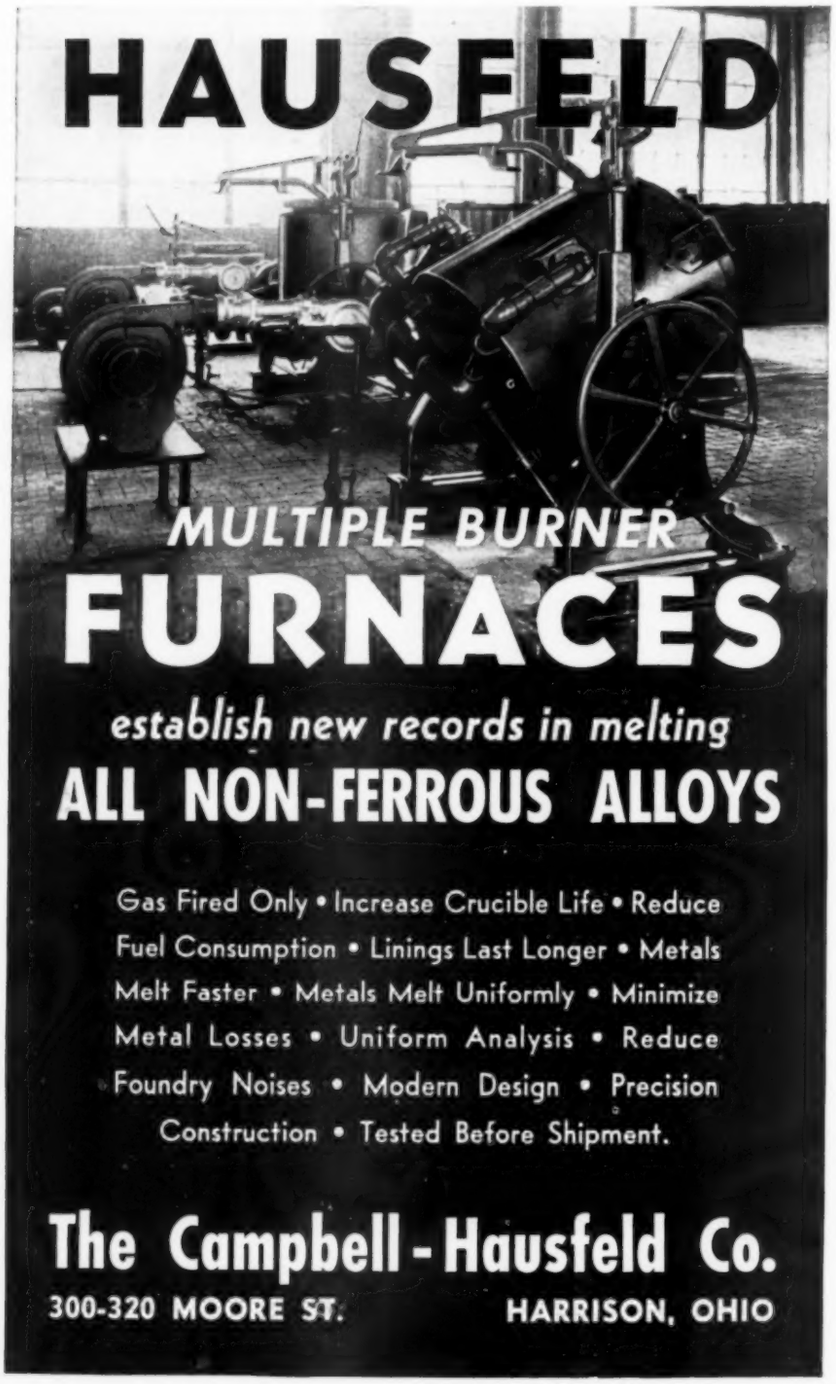
Blue (Dawn) shift. Working hours from 4:00 a.m. to noon. Leisure in the afternoon. Sleep from about 7:00 p.m. to 3:00 a.m.

This shift timing has a number of advantages. One of the distinct advantages is the relatively small displacement of the customary sleeping hours, as no one is compelled to sleep in the afternoon hours, when it is hardest to sleep. Another advantage is that it also makes shift changing fall at hours which are not generally community rush hours.

The *Red* shift will appeal to young unmarried men and women who like to have their recreation late in the evening as it would enable them to stay up to or beyond midnight and sleep later in the morning.

The *White* shift will appeal to middle-aged individuals whose social life has altered. As their children have all grown up they would not be disturbed while sleeping during the forenoon hours. They would have the afternoon free as they would not be due to begin work until 8:00 p.m.

The *Blue* shift fits in well with the schedules of families of the intermediate age groups, where there are small


HAUSFELD
MULTIPLE BURNER
FURNACES
establish new records in melting
ALL NON-FERROUS ALLOYS
Gas Fired Only • Increase Crucible Life • Reduce Fuel Consumption • Linings Last Longer • Metals Melt Faster • Metals Melt Uniformly • Minimize Metal Losses • Uniform Analysis • Reduce Foundry Noises • Modern Design • Precision Construction • Tested Before Shipment.
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children. The father could go to bed early in the evening at the children's retiring time. He would return from work shortly after noon and have the afternoon free.

With five eight-hour working shifts per week, the weekly holiday of two days may have an upsetting effect on the establishment and maintenance of the displacement cycle, in that it is too much to expect workers to stay up during the odd hours which they devoted to work during the five days preceding. One answer to this problem is to decrease the weekend break to one day, and the 48 hour day week is coming, where it has not yet been adopted. The effect of the common tendency to revert to "community" sleeping hours on free days is minimized, if the sleeping hours on work-days are displaced in one direction or another only 4 hours, instead of 8 (as necessary under the graveyard shift system). Another solution of the weekend break problem is to have the workers continue without interruptions on a 7 day per week basis for a number of weeks and then be given one week's vacation, but that is a matter that has to be settled locally, with the co-operation of the workers themselves, and is certainly more feasible in certain types of work than in others.

Earn One Week Vacation

In special situations an acceptable solution of this problem is to institute four six-hour shifts, each worker putting in 7 days per week, or a total of 42 hours. After 20 weeks of work one would thus put in 840 hours which is the same number that he would put in 21 weeks at 40 hours per week. He would then have earned and receive a week's vacation, and if rotation of shifts is adopted, the change can be made after the week's vacation. By having 20/21 of the whole force working, 1/21 can be off of successive weeks. With the four-shift arrangement, the distribution could be as follows:

A. *Red* shift: working hours 3:00 p.m. to 9:00 p.m. Sleeping hours as in the *Red* eight-hour shift.

B. *White* shift: working hours 9:00 p.m. to 3:00 a.m. Sleeping hours as in the *White* eight-hour shift.

C. *Blue* shift: working hours 3:00 a.m. to 9:00 a.m. Sleeping hours a little earlier than in the *Blue* eight-hour shift.

D. *Gold* (Sunshine) shift: working hours 9:00 a.m. to 3:00 p.m. Sleeping hours, as usual, at night.

Some industries may find it impossible to run their machinery continuously and may have to adopt two ten-hour shifts. These shifts could be distributed upon a satisfactory basis as follows:

A. The early shift from 4:00 or 5:00 a.m. to 2:00 or 3:00 p.m.

B. The late shift from 2:00 or 3:00 p.m. to midnight or 1:00 a.m.

By this arrangement no one would be expected to work during the early morning hours of greatest inefficiency. The shifts could be "steady" or of infrequent rotation to meet the particular conditions.

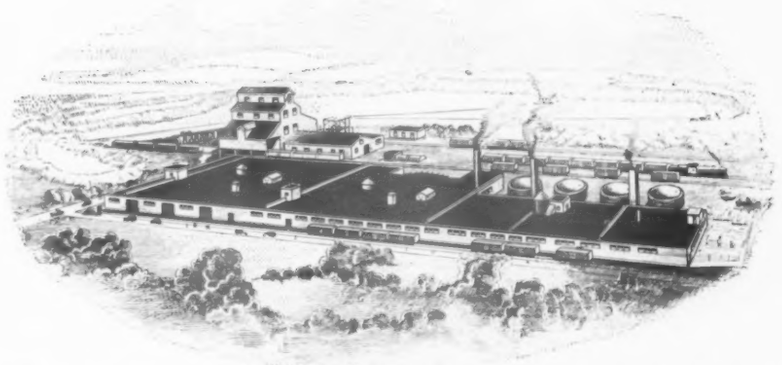
In sum, the scientific solution of the multiple shift problem is not bound up with the number of shifts and the duration of each. The important elements are a minimum displacement of the normal cycle of activity and a sufficient time on the odd schedule of hours to enable the individual to adjust himself by not only developing, but also keeping the newly established cycle.

From a paper on "A Scientific Solution of the Multiple Shift Problem," by Prof. Nathaniel Kleitman, Department of Physiology, University of Chicago, presented at seventh annual meeting of Industrial Hygiene Foundation, held at Mellon Institute, Pittsburgh, Nov. 10, 1942.

Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Avenue, New York, recently has published an interesting booklet entitled "Getting More Work from Your Typewriters." The presentation is a study based on practices being used successfully by a number of companies.

GOOSE LAKE

Fire Clay and
Fire Clay Flour
Fire Clay Brick
Therm-O-Flake Insulation



Goose Lake Clay Deposit with Clay Grinding and Fire Brick Plant

Illinois Clay Products Company
JOLIET, ILL.

Select Proper

GRADE OF MOLDING SAND

By D. E. CUTLER
J. S. McCormick Co., Pittsburgh

A FOUNDRY sand mixture is an aggregate of silica sand grains, bonding material and water. Each of these is essential and each ingredient plays an important part in the production of castings. They must be stable to resist heat shock. Stable to resist a rapid rise in temperature when the metal fills the mold.

Unfortunately, sand is not an ideal material for making molds or cores. The foundryman must learn the best way to serve the purpose. Sand is cheap and abundant. It has been employed in the foundry for many years and in all probability will be used for many years in the future. Sand should be selected to suit the type of work. It should be properly bonded and the facing or sand insulator should be suitable for the sand mixture.

Selection of sand has not been given enough thought or study by the average foundryman. Over a period of several years we have tested sands in a large number of foundries. The statement may be ventured that 75 per cent of these sands were not the best grade for the class of castings on which they were used. They were either too fine or too coarse. Where the sand was too fine the operators attempted to open it by the addition of a coarser grade. No benefit was secured because the fine sand simply filled the voids between the coarser grains. In the majority of instances the practice resulted in a poorer rather than an improved grain distribution. Sands were too coarse in nearly all steel foundry samples submitted. The castings showed poor finish and metal penetration.

Add Silica Flour

The foundryman claims that the sand has fused. Actually the sand is filled with metal. In the majority of instances of this kind a finer sand would prevent a great part of this so-called fusion or metal penetration. The popular cure is to add silica flour in sufficiently large quantity to reduce the permeability to a point considered best. Unfortunately there is too much difference of opinion on the subject of safe permeability. Silica flour raises hot strength, increases expansion and therefore should be used with full recognition of its characteristics at high as well as at low temperature. Good sand will leave at least 60 per cent or more of the silica grains on three adjacent screens. Proper grain distribution has a very decided influence on the performance of sand at high temperature.

Bonding the sand properly is one of the most important features in the production of good castings. The problem is to provide a bond that will function satisfactorily at all stages between room temperature and molten metal temperature. Many foundrymen use bonds suitable for low temperature, but totally unsuitable at high temperature. Other men use bonds which perform satisfactorily at high temperature, but with nothing to hold the sand grains at low temperature. Bonding materials may be classified in two general groups: Low temperature or combustible type, and high temperature or noncombustible type. The combustible type includes cereals, oils, pitch and water soluble materials. The noncombustible binders in-

CORE-MOLD SPRAYER

10 CORES SPRAYED—WHILE ONE IS BEING BRUSHED!
. . . AND CORES ARE SMOOTHER

GREEN CORES ARE SPRAYED AS EASILY AS BAKED CORES

During application, the blacking material is being CONSTANTLY AGITATED

DEEPER PENETRATION, THEREFORE NO FLAKING OR WASHING

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THE FREEMAN SUPPLY CO.

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Mahogany and Pine Pattern Lumber

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clude the various clays and bentonites.

Bonding material must meet several requirements. It must impart sufficient green strength to the sand in the mold or core. The sand must have sufficient dry strength and hot strength for the mold or core to hold its shape at high temperature.

Possibly with one or two exceptions the combustible bonds give high dry strength, low hot strength and fast collapsibility. The noncombustible or clay type bonds give good green strength, high hot strength and low collapsibility. This double duty performed by clay, may lead the foundryman into difficulty. Unfortunately one feature cannot be had without the other. A common mistake is to increase the amount of clay or natural molding sand to secure higher green strength or dry strength without realizing or giving any consideration to the effect this will have on the hot strength or collapsibility. Another common error is to increase the amount of combustible bond to produce a hard mold or core, where actual conditions require an increase in the clay to raise the hot strength.

Majority of foundry sands should contain both types of bond. Amount of each will depend on several factors including size of casting, thickness of metal section, temperature of metal, method of molding, etc. Final adjustment will be made as result of actual performance.

Blacking Is Insulator

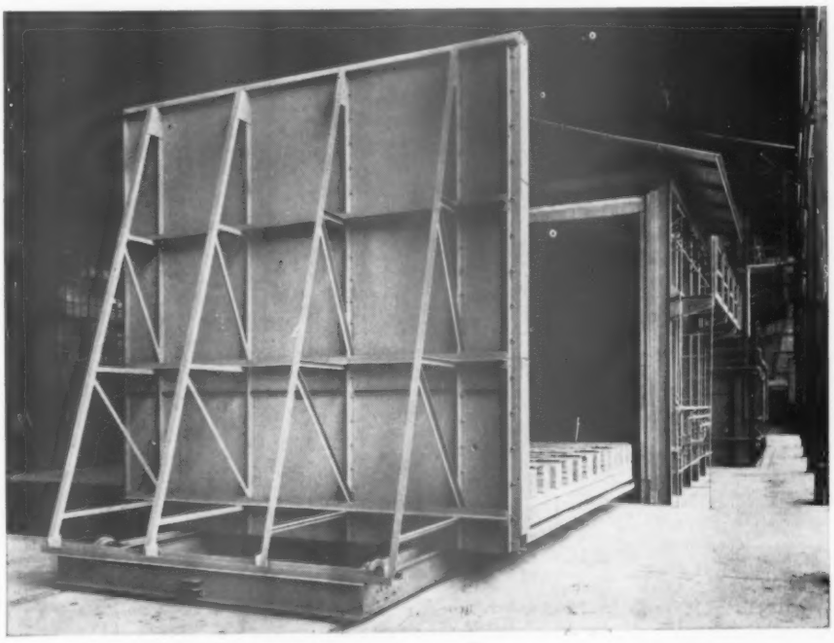
Facing or sand insulator materials include blacking, core wash, mold wash, chill wash, core dip and green spray. A grade should be selected to harmonize with the sand mixture. Blacking is an insulator between the hot metal and the sand to reduce the heat transfer from metal to sand surface and thereby prevent fusion of sand and metal. Blacking is not a cure-all for poor foundry sand, but usually it helps a poor sand to produce a better casting. A blacking should be selected which goes on smoothly and evenly and stays smooth until the casting is poured. Two important features should be considered: Sand mixture, and type of application.

Sand is the foundation for blacking. The two must work together. Some sands are wet, some are dry, some are strong while others are weak. A strong sand provides the best foundation for blacking, but it may not be suitable for the casting. The sand should be selected to meet the requirements of the casting. Characteristics involved include green strength, dry strength, hot strength, etc. Every combination of these characteristics forms a different foundation for blacking. One blacking is not suitable for use with all sands. Sand mixtures containing cereal binders take blacking more easily and readily than sands bonded with oil or pitch.

Method of application is governed to a considerable extent by the type and size of mold or core. Adjustments in manufacture are required to meet the several methods of application. Further adjustment is required in the shop to meet local conditions. As with the sand, blacking must perform well through the range from room to metal temperature. Where difficulty is experienced with blacking during application, in the drying period, or during the pouring of the mold, it is safe to assume that the blacking was not suited to the sand mixture.

From a paper presented at the November meeting of the Pittsburgh Foundrymen's Association. The author, D. E. Cutler, is connected with the J. S. McCormick Co., Pittsburgh.

Eagle Grinding Wheel Co., 2519 West Fulton street, Chicago, is erecting a one-story addition to its present facilities for manufacturing abrasive wheels.



VULCAN ANNEALING, NORMALIZING AND HEAT TREATING FURNACE...

With Improved Firing and Control Features

A new method of direct firing, in the Vulcan Car Hearth Furnace illustrated above, produces a convection effect and provides greater efficiency and economy in the heat treatment of castings and weldments. Advantages: Less time to uniformly heat the charge to temperature; better uniformity at temperature; more rapid, uniform rates of heating, even when charge is not uniformly loaded in furnace; elimination of localized high temperature areas, thus reducing furnace maintenance and lengthening furnace life. Oil or gas fired, with several zones of control.

Send for complete information about this and other Vulcan custom-built furnaces for Annealing, Normalizing, Stress Relieving and other Heat Treating Operations; Forging, Melting and Special Heating work.

VULCAN CORPORATION
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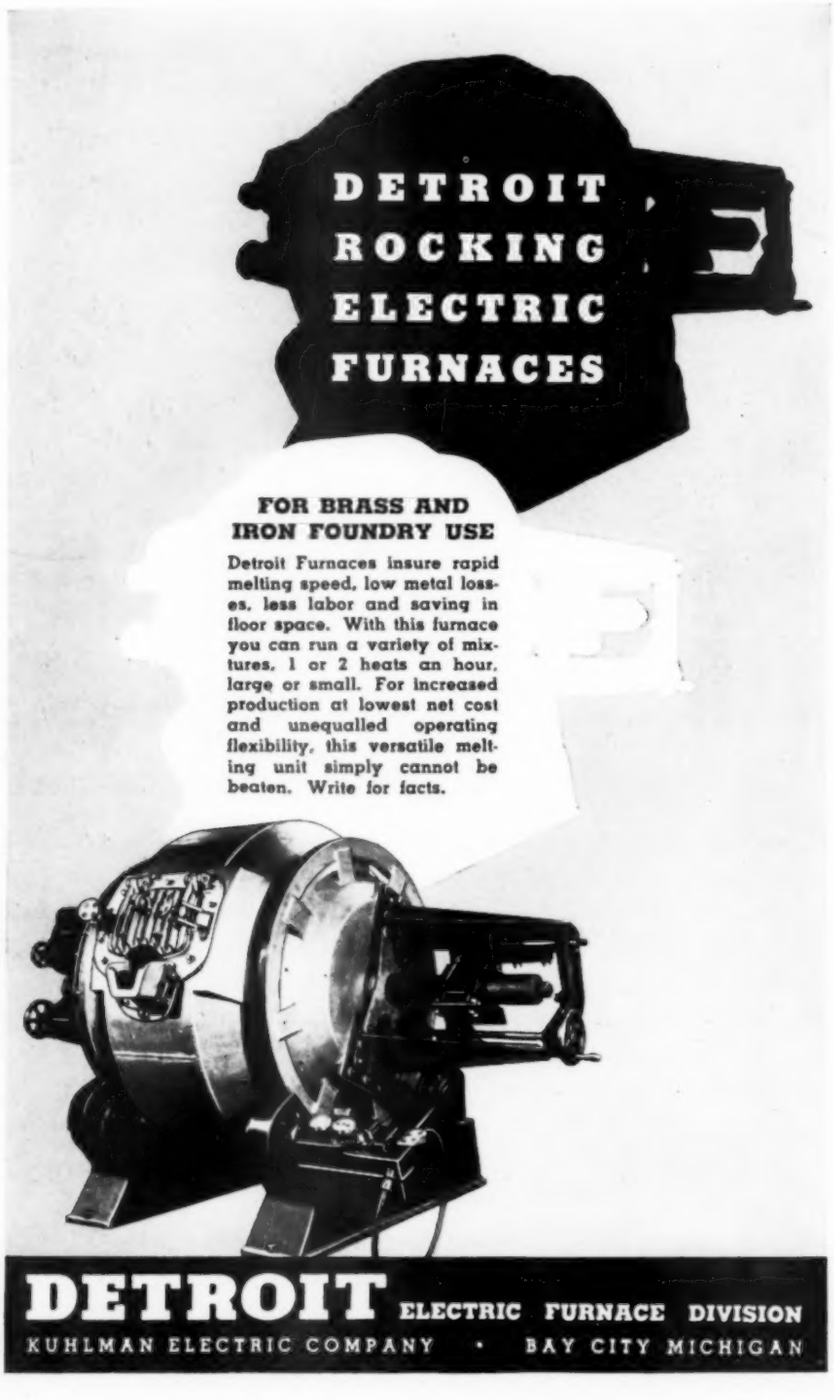
Hygiene Foundation Holds Meeting

Four new members have been elected to the board of trustees, Industrial Hygiene Foundation, at the annual meeting held recently at Mellon Institute, Pittsburgh. They are: Ned H. Dearborn, executive vice president, National Safety Council; Prof. Philip Drinker, Harvard School of Public Health; Lieut. Col. A. J. Lanza M.C., chief, Occupational Hygiene Branch, U. S. Army; Dr. C. D. Selby, medical consultant, General Motors Corp. Other members of the board were re-elected.

Dr. John F. McMahon recently was appointed managing director of the Foundation to succeed Dr. H. B. Meller who retired from active management because of ill health. Dr. Meller continues as consultant. Dr. Raymond Hussey, State Industrial Accident Commission, Baltimore, was appointed to the foundation's medical committee.

More than 500 representatives from 200 industrial concerns and a number of governmental agencies attended the annual meeting which was held Nov. 10 and 11, and which had for its theme, "Keep War Workers Well". Program highlights included a keynote address on manpower conservation by Paul V. McNutt, chairman of the War Manpower Commission. A section was devoted to a discussion of "More Manpower Through Reduction of Absences," with Dr. R. R. Sayers, director, U. S. Bureau of Mines, presiding. Subjects covered include the common cold, the role of psychology and psychiatry in absences and a progress report on a study to reduce sick absences which is being conducted by a number of the Foundation's member companies in collaboration with the U. S. Public Health Service. Dr. T. Lyle Hazlett, medical director, Westinghouse Electric & Mfg. Co., directed a panel on "Putting Women, Older Men and Physically Handicapped to Work".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ROCKING
ELECTRIC
FURNACES
FOR BRASS AND
IRON FOUNDRY USE
Detroit Furnaces insure rapid melting speed, low metal losses, less labor and saving in floor space. With this furnace you can run a variety of mixtures, 1 or 2 heats an hour, large or small. For increased production at lowest net cost and unequalled operating flexibility, this versatile melting unit simply cannot be beaten. Write for facts.
DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

Weight of Castings

National Engineering Co., 549 West Washington boulevard, Chicago, has prepared an ingenious slide rule calculator for determining the weights of castings by breaking them down into component simple elements, such as rectangles, rounds, triangles, rings, etc. These relative weights are added, and from their total is subtracted any hole or holes in the sections. Besides listing factors for steel, gray and malleable iron, aluminum, magnesium, brass and bronze castings, the calculator also gives factors by which weights of mahogany and white pine patterns, baked core sand, rammed molding sand, clay and pressed brick may be determined.

Book Review

Tin Solders, by S. J. Nightingale and O. F. Hudson; fabricoid; 117 pages 5 x 8½ inches; 51 illustrations, 15 tables; references and index; published by Chemical Publishing Co., Inc., Brooklyn, N. Y., price $2.75.

This study of the properties of tin solders and soldered joints in intended more for those who actually use solder than for those who make or buy it. Consequently the factors which bear on the technique of joint making and those which influence the choice of the most suitable solder for a given service are stressed at the expense of points of more academic interest. The work is presented in two parts under nine chapter headings: Introduction, constitution of the tin solders, structure of solders, physical properties of the solder alloys, strength of soldered joints, creep properties of soldered joints, alloying between the solder and the joint members, practical considerations, choice of a solder.

foundry activities

VALLEY Mould & Iron Co., Cleveland, acquired the American Steel & Wire Co.'s former Newburgh works on East Ninety-first street, Cleveland and is erecting new plant facilities. The project includes ladle building, hot metal building, casting building, ramming building, finishing building, pattern shop and service shop. William H. Ramage is president.

° ° °

Miller Brass Foundry, 791 Hertel street, Three Rivers, Que., is erecting a plant addition.

° ° °

Aluminum Co. of America, Jackson County, Mo., has let contract for additions to its foundry and other buildings.

° ° °

J. P. Hansen Foundry Co. Inc., 1745 North St. Louis avenue, Chicago, is constructing a building for additional storage space.

° ° °

North End Foundry Co., West Allis, Wis., has given contract to W. O. Krahn, for a one-story foundry addition.

° ° °

Lockheed Aircraft Corp., 1705 Victory place, Burbank, Calif., will construct an addition to its foundry.

° ° °

Axelson Mfg. Co., 6160 South Boyle avenue, Los Angeles, is constructing a mezzanine floor in its plant.

° ° °

Index of new equipment orders for October, 1942, according to a report of the Foundry Equipment Manufacturers' Association, Cleveland, was 552.2 as compared with 452.4 in September. Index for repairs was 505.5. Index of 100 represents the monthly average of reported sales to metalworking industries during 1937-38-39.

° ° °

Employes of the Monessen Foundry & Machine Co., Monessen, Pa., have enrolled 100 per cent in the subscription of 10 per cent of their earnings for the purchase of war bonds.

° ° °

Ebaloy Foundries Inc., South and Pleasant streets, Rockford, Ill., is constructing a 1-story foundry addition.

° ° °

Metals & Alloys Ltd., 7 Wiltshire avenue, Toronto, Ont., has let contract to

GATES and RISERS in any metal

in far Less Time with

Tannewitz METAL CUTTING BAND SAWS

Variable Speed

Models to fit Every Need

In addition to our regular High Speed Band Saws delivering over 2 miles of smooth vibrationless saw travel per minute, which have proved so exceedingly popular in automotive and aviation work, the TANNEWITZ line now offers five other models to provide the fastest cutting medium for every foundry need: a 30" machine to provide any speed from 300 to 900 blade feet per minute—a similar machine with 3-step V-belt drive to give 2300, 3100, 4000 blade feet per minute—a 36" machine with 32" capacity under the guide—a model with 48" wheels and one with 52" wheels, operating at 3,000 blade feet per minute for handling extra large castings. Get a line on the TANNEWITZ metal cutting band saw that fits your particular needs. It will save time, step up production and repay its cost dozens of times. Write for full particulars NOW!

THE TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN

Dickie Construction Co. Ltd., 17 Yorkville street, Toronto, for several plant additions which include an aluminum and bronze foundry, magnesium foundry building and receiving, shipping and laboratory building.

• • •

Dominion Foundries & Steel Ltd., Depew street, Hamilton, Ont., has received bids for plant additions.

• • •

Nordberg Mfg. Co., 3073 South Chase avenue, Milwaukee, has let contracts for several building additions to its plant which will include a heat treating building, storage facilities, and factory additions.

• • •

Warman Steel Casting Co., 6100 South Boyle avenue, Los Angeles, is erecting a new laboratory building.

• • •

Crown Iron Works Co., 1229 Tyler street North East, Minneapolis, has let contract for two additions to its foundry.

• • •

Aircraft Foundry Co., 5208 Malabar street, Huntington Park, Calif., is the firm name under which Victor Caliva has obtained a certificate to conduct business.

• • •

Diamond Iron Works Inc., 1725 Second avenue North, Minneapolis, has let contract for remodeling of its plant.

• • •

Ampco Metal Inc., Milwaukee, has awarded contracts for one-story foundry addition.

• • •

H. E. Bremer Mfg. Co., 1456 North Thirty-first street, Milwaukee, has let contract for a one-story factory addition.

• • •

Crucible Steel Casting Co., 2850 South Twentieth street, Milwaukee, has awarded general contract for construction of a one-story foundry.

• • •

D. J. Murray Mfg. Co., West street and Thirteenth avenue, Wausau, Wis., is remodeling and making alterations to its plant.

• • •

Canadian Car & Foundry Co. Ltd., 621 Craig street West, Montreal, Que., is building an addition to its foundry in Amherst, N. S.

• • •

St. Thomas Bronze Co. Ltd., St. Thomas, Ont., has let contract to Sidney Jones, London, Ont., for a plant addition.

• • •

National Bearing Metals Corp., 364 Ninth street, Jersey City, N. J., has let contract for a two-story addition.

• • •

Waukesha Foundry Co., Waukesha, Wis., has started construction of one-story foundry addition. R. H. Bierman, Milwaukee, is architect.

• • •

Bartlett-Hayward Division, Koppers Co., 200 Scott street, Baltimore, has let contract for construction of a service building at Scott and McHenry streets.

• • •

Oscar W. Hedstrom Corp., 4836 West Division street, Chicago, is constructing additional manufacturing space in which to make wood and metal patterns.

• • •

Hanford Foundry Co., 119 South Arrowhead avenue, San Bernardino, Calif., has been issued a building permit for construction of an addition to its plant.

• • •

Major Aircraft Foundry, 740 West Valley boulevard, Puente, Calif., is the firm name under which Laurence E. Crosby and A. Jerome Leonard have obtained a certificate to conduct business.

METALLURGICAL TESTING EQUIPMENT

Especially designed and engineered for the rapid, precision, testing of metals.

AB Specimen Mounting Press No. 1315
AB Standard Polisher No. 1500
TRANSOPTIC MOUNTS provide circumambient visibility of specimen.

NEW SPECIMEN MOUNT PRESS—Constructed with a rugged simplicity that will give long service, and precision built for accuracy. The molding tools are lapped finished for close tolerance with a perfect fit. Either 1" or 1¼" molds may be used with ease on the AB presses.

The new design retains the solid heater which brings the mold to top temperature faster; however, on the new model, it is not necessary to release the pressure before cooling the sample. This is accomplished by sliding the heater up the mold onto a holder pin and swinging a pair of finned cooling blocks into position, where they are held by a locking lever.

AB STANDARD POLISHERS—Maximum convenience and comfort in operation is attained by exclusive features such as the removable splash ring that serves as a hand rest, and the mounting of the polishing disc that is keyed to a tapered arbor on the motor by means of a stout sleeve. This reduces peripheral vibration to a minimum. The polishing disc is 8" in diameter to accommodate large specimens and gives increased peripheral speed. The disc is equipped with a new type cloth clamp for quick changing.

A complete line of equipment for the Metallurgical Laboratory . . .

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Adolph I. Buehler

OPTICAL INSTRUMENTS ★ METALLURGICAL APPARATUS

228 North LaSalle Street, Chicago, Illinois

Obituary

THOMAS M. Foley, former superintendent, Griffin Wheel Co., Tacoma, died Nov. 6. Due to his health he retired from active service Jan. 1, 1940 after 37 years connection with the company. His first appointment at Tacoma was in 1911. After serving there for 15 years he was transferred to Chicago as superintendent of the foundry division and remained there until failing health induced him to return to Tacoma. He was well known in foundry circles, particularly in the northwestern states.

° ° °

Albert Kahn, 73, founder of Albert Kahn Associated Architects and Engineers, Detroit, died Dec. 8 in Detroit.

° ° °

James A. Wolf, 63, former foundry superintendent, Chicago Hardware & Foundry Co., North Chicago, Ill., died recently at Waukegan, Ill.

° ° °

Herman Westphal, 92, who went to Chicago in 1880 and was employed for 38 years as a molder by International Harvester Co., died in that city, Nov. 28.

° ° °

Frank J. Weschler, 59, director and vice president, Chain Belt Co., Worcester, Mass., died at Milwaukee recently. Mr. Weschler was in charge of the Springfield and Worcester, Mass. plants.

° ° °

Harry F. Henninger, 61, foundry superintendent, Farmall works, International Harvester Co., Rock Island, Ill., died Dec. 8. Mr. Henninger had been associated with the company 12 years, and was foundry superintendent for the past 4 years.

° ° °

Jacob Hajek, 88, one of the organizers of C. O. Bartlett & Snow Co., Cleveland, and associated with that company and its predecessor companies for 55 years, died in Cleveland Dec. 7. Mr. Hajek retired from active business 25 years ago but had retained his association with the Bartlett and Snow company.

° ° °

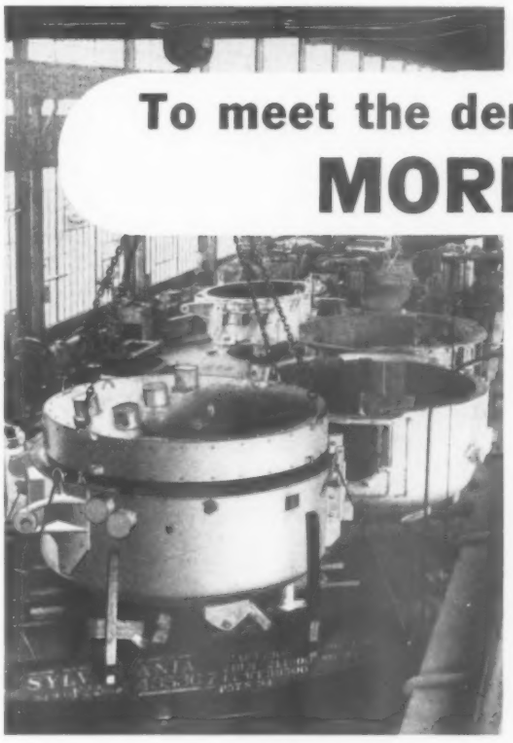
Robert Allen, 75, for the past several years foundry manager, Ford & Kimball Foundry Co., Concord, N. H., died from a heart attack in that city Sept. 10. He was born in Johnstone, Renfrewshire, Scotland Jan. 29, 1867 and came to the United States at the age of 16. He served an apprenticeship with Bell & Fife, Newark, N. J. and shortly after the turn of the century was appointed foundry foreman with the Manufacturer's Foundry Co., Waterbury, Conn. Later he was identified as superintendent and manager of several New England foundries.

° ° °

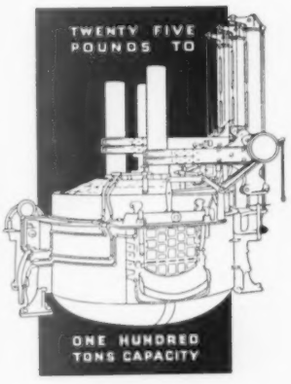
Dr. Percy Longmuir, 66, consulting metallurgist, died recently at his home in Sheffield, England. Dr. Longmuir was a founder member of the Institute of British Foundrymen, of which he also was a past president. He was awarded a Carnegie research scholarship by the Iron and Steel Institute and spent 2 years in the metallurgical department, University of Sheffield, and later a short period at the National Physical Laboratory, Teddington, England. From 1914 to 1918 Dr. Longmuir served as works manager of the Stocksbridge work, Samuel Fox & Co. Ltd. Since that time he has devoted his time almost exclusively to consulting work.

° ° °

Frederick Van Voorhees Lindsey, vice president and general sales manager, Driver-Harris Co., Harrison, N. J., died recently in New York after a brief illness. Mr. Lindsey was born in Streator, Ill., but resided in Chicago until 1916 when he became associated with the Electrical



To meet the demand for
MORE STEEL!



Shop view of Lectromelt furnaces under construction.

MOORE RAPID *Lectromelt* FURNACES

Increasing numbers of Lectromelt Furnaces are going into 24 hour daily operation to produce more quality steel.

In addition to these new furnaces, the top charge feature of Lectromelts is also boosting the tonnage of electric steel departments, through improvements in design which permit more rapid charging of the furnace and less time between heats. Their use results in less power, electrodes and refractories.

Top charge type Lectromelts increase production and lower operating costs. Write for complete information.

PITTSBURGH LECTROMELT FURNACE CORPORATION
PITTSBURGH, PENNSYLVANIA

Alloy Co., as vice president and general manager. In 1925, when the Electrical Alloy Co. was absorbed by the Driver Harris Co., he was elected vice president and general sales manager.

* * *

Dr. Frederick B. Beckett, 67, pioneer in the electrometallurgical industry and a consultant to the Union Carbide & Carbon Co., New York, died Dec. 1 in New York.

* * *

Benjamin Weil, 73, president, Weil-McLain Co., Chicago, with foundries in Michigan City, Ind., and Erie, Pa., died in Chicago Dec. 8, following a short illness. Born in Austria-Hungary and going to Chicago in 1888, Mr. Weil was one of the founders of the manufacturing firm which began business as Weil Bros. Co. in 1892.

* * *

Bennet B. Bristol, 74, a founder of the Industrial Instrument Co. which later became the Foxboro Co., Foxboro, Mass., died at his summer home at Falmouth Heights, Mass. on Nov. 10. Mr. Bristol, with his brother Edgar H. Bristol founded the Industrial Instrument Co. in 1908. Throughout the history of the Foxboro company he served as its treasurer and clerk.

* * *

Anton Schauer, founder of the National Aluminum Match Plate Co., Cleveland, died at his home in East Cleveland, O., recently. Mr. Schauer began his industrial career as a foundryman when he was 17 and worked his way up to ownership of his own plant. He directed the activities of the company until his health failed 2 years ago.

* * *

W. J. Rowley, sales representative, International Molding Machine Co., Chicago, died at his home in Marion, O., Dec. 10. Mr. Rowley was born in Union, Wis., and was a graduate of the University of Wisconsin. He served an apprenticeship in the foundry of the Baker Mfg. Co., Evansville, Wis., and later became associated with the Bucyrus-Erie Co., Milwaukee, Richmond Radiator Co., Uniontown, Pa., Huber Mfg. Co., Marion, O., and the Anniston Steel Co., Anniston, Ala. Mr. Rowley had been connected with the International Molding Machine Co. since 1925.

"BRANFORD"

The VIBRATOR *with the kick*

PLATE VIBRATORS . . . *All steel hardened and ground.* The Regular type is a spring type for horizontal operation. Another, the Angle Springless, operates at 45°. It is excellent for use in close molding. A third type is the Double Attaching Head, for use on plates with specially designed lug.

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This is but a part of our large line of Air Operated, Labor saving Foundry Equipment. Write Dept. 5 for complete catalogue.

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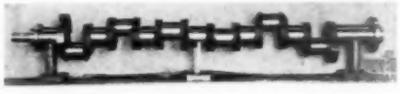
Hopper Vibrators
Container Loading Vibrators
Annealing Pot Vibrators
Vibrator Tables

Wear Is Low

Value of hardening metal by electrical induction recently was demonstrated when the crankshaft of one of the world's fastest streamline trains was inspected after the locomotive had piled up a million miles of service. In checking the



engine parts the wear on the crankpins was found to be only 0.001-inch. Hardening the pins of the crankshaft was accomplished by an electrical induction process introduced by the Ohio Crankshaft Co., Cleveland, which is said to provide accurate control of depth, width and structure of the hardened area. The process also is used for hardening smaller motor parts, gun bolts, tank grousers, armor piercing shot, and other parts for the war effort.

Officers of the International Acetylene Association elected at the annual meeting held recently in Cleveland are: President, Ellsworth L. Mills, vice president, Bastian-Blessing Co., Chicago; vice president, Glenn O. Carter, consulting engineer, Linde Air Products Co.; secretary, Herbert F. Reinhard, Union Carbide & Carbon Corp.; and treasurer, Philip Kearny, president, K-G Welding & Cutting Co., New York.

SKIN DRY SAND FOR

Large Glass Molds

FOUNDRYMEN who are not accustomed to the practice of skin drying molds occasionally may find it necessary to inquire into the technique and merits of this insurance factor. In one instance trouble was experienced in the production of some large cast iron bowl shaped molds for a glass factory. These castings had an approximate metal thickness of 3 inches and weighed from 500 to 1000 pounds each. Large internal chills were used to densen the iron. The sand in the molds appeared to cut or scab with resulting large rough areas on the castings. Skin drying the molds was tried, but the result was not satisfactory. Sand on the surface appeared to crumble worse than in the green sand state.

Several methods are employed for drying molds. A choice usually is dictated by local conditions and available equipment. For example the entire mold may be placed in an oven and dried all the way through. This method involves the use of cast iron or steel flasks, a suitable oven and crane service for handling the molds. Obviously this method is not applicable with wood flasks, or where the pattern is bedded in the floor. Molds may be skin dried by various methods and with various types of fuel. The depth to which the sand is dried depends almost altogether on the length of time the heat is applied.

Three Methods Available

In one method the mold is closed and then dried with hot air. A pipe from a stove is inserted in a suitable opening. A fan drives air through the fuel. The heated air passes through the pipe and into the mold. In a second method an oil or gas torch is employed. The flame is played over the surface until the sand is dried to the required depth. A certain amount of skill is required in the manipulation of the torch to prevent burning the sand. In a third method, one or a number of gas jets are placed in the mold and allowed to burn until the mold is dried. In a variation of this method one or more coke baskets are placed in the mold. In another variation charcoal either is burned in a basket or spread on a plate.

Since the process of skin drying is so comparatively simple and so widely employed in a satisfactory manner, it seems logical to infer in this instance that some other factor may be responsible for the rough castings. In cases of this kind a checkup on the following points is suggested: 1—The sand may not be adapted to skin drying. 2—The face of the mold may be burned. 3—The mold may not be vented properly. 4—The inserts may be responsible for all or nearly all the trouble.

While practically any kind of sand may be skin dried, any or all types of sand will not stand up against a casting 3 inches thick. In the present instance a coarse grain sand well bonded with clay is required. Where a good skin drying is required, say to a depth of ¾-inch, it is advisable to add a little flour or other commercial bonding agent to the facing sand. In any method adopted for drying the mold, care must be exercised to prevent burning the sand. The heat must be applied slowly and carefully.

The third count hinges to some extent on whether this particular mold is cast with the concave face in the cope or in the drag. Presumably, since this is the working or finished face of the casting, it is molded in the drag. The vent

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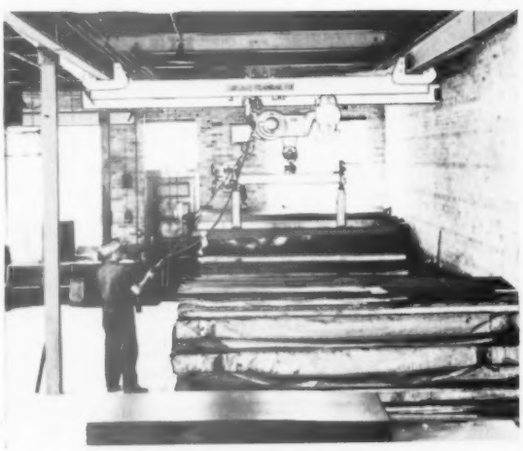
(Up to 45 ft. Span)



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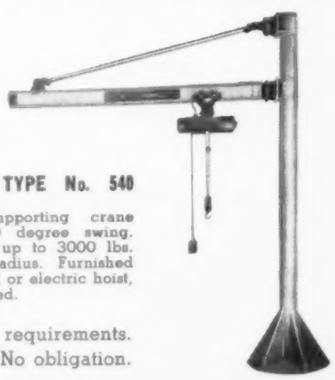
Use either the Push-Type—Hand-Geared or Motor-Driven type equipped with 1, 2 or 3 motors operated by pushbutton control from the floor. Span up to 45 ft. between beam centers. Motor driven types have reducer units fully enclosed, running in oil. Trucks on all types are structural members of box construction for strength and rigidity. Steel wheels have double row ball bearings.



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must escape freely from the large mound of sand. Otherwise the steam and gas generated will cause the metal to bubble, and in extreme cases will lift portions of the sand with a resulting dirty and scabby face.

The fourth count in the indictment is based on the condition of the inserts which are employed to densen the grain of the metal in the casting. If they are perfectly clean and dry, they will cause little or no trouble. If they are not perfectly clean and dry, they will cause the metal to boil more or less violently and this action will cut the sand.

Considers Problems Of Common Cold

In addressing the seventh annual meeting of the Industrial Hygiene Foundation in Pittsburgh, Nov. 11, Dr. Simon S. Leopold, University of Pennsylvania, Philadelphia, stated that the common cold is the most frequent infectious disease in the United States and it is economically the most wasteful. The causative agent is a specific filtrable virus, and in cases uncomplicated by secondary invasion the cold is a short, self-limited disease. Frequency of secondary bacterial invasion increases the seriousness of the common cold to such an extent that the physical disability produced by it constitutes a major industrial problem.

Ideal methods of prevention of contagion include:—isolation of the infected individual. Adequate spacing and sufficient natural ventilation, regardless of season, are not feasible for industry, particularly in the present emergency. Use of face masks for infected workers is impractical and ineffective. Prophylactic vaccines whether administered by mouth or hypodermically are of no value for those with sufficient natural immunity to resist repeated colds. They are chiefly useful in the prevention of secondary bacterial complications. The wholesale and indiscriminate administration of cold vaccines lacks scientific data in support of their use.

No so-called abortive treatment of a cold shortens the disease. Bed rest may prevent its complications.

In the absence of the specific virus, chilling and fatigue do not cause colds, but probably diminish resistance to the infectious agent.

Methods of air sterilization to be as effective as possible must be based on the knowledge of how bacterial and virus air-borne infections are conveyed.

It would appear from the studies of Andrewes that ultra-violet light is very effective against the bacteria and viruses present in sprays from coughing and sneezing, and probably much less so against the organisms in dust. With this reservation it is an almost ideal method of air sterilization but the cost of installation and maintenance in large factories make its general use impractical.

Propylene Glycol Vapor as an aerosol is inexpensive, relatively nontoxic and extremely effective against bacteria, human influenza virus "A" and probably also against the virus of the common cold. More extensive clinical study and practical methods of vaporization on a large scale remain to be devised.

Mechanical ventilation with air filtration diminishes the number of air-borne bacteria and viruses. The ideal method of air sterilization may prove to be the combination of mechanical air conditioning and air filtration with either ultra-violet light or with one of the effective aerosols such as Propylene Glycol. The best method will depend upon the size and other physical features of the particular space to be sterilized.

Labor-management committees are conducting war production drives in 1600 American factories, including many foundries.

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the vitamin charge for your iron

MORE *"life"* and *"freshness"* to your iron are the admitted qualities when Mexite Briquettes are added to your cupola charge—a sort of vitamin pick-up that finds its way into your castings by raising the carbon content of the molten iron.

Mexite Briquettes are a combination of specially processed Mexican Graphite together with a fluxing bond developed in our laboratory. In action, the Briquettes disintegrate into especially sized graphite crystals that dissolve readily into the iron in the melting zone and cupola well. Closer carbon control is assured.

Today is an all-important time to try this Mexican Graphite product!

THE UNITED STATES GRAPHITE CO.
SAGINAW, MICHIGAN, U.S.A.

TRENCH MORTAR BOMBS PASS INSPECTION

(*Continued from page* 69)

cores are dried they are dipped in a silica wash bath which it is claimed imparts a more uniform coating, than can be imparted by brushing or spraying. This is an important feature because it has a bearing on the concentricity and the wall thickness of the casting. The print end of the core is slightly tapered and also is slightly over size as compared with the print in the bottom of the mold. The set of eight cores is placed in approximately the correct position in the mold. Then a jig is placed over the top and all the cores are forced down tightly in the prints. This tight or driving fit anchors the cores accurately and firmly in position.

In addition to the main core, a small ring core is set in each mold at the drag joint. At this point a narrow band is machined on the casting. Development of slight porosity in the early experiments suggested the use of a cast iron chill ring. Application of the chill cured the trouble, but constant replacement, machining and handling of the chills presented an expensive and annoying problem. Dry sand ring cores were substituted for the cast iron chill rings with satisfactory results. Just another example of something all wrong in theory, but all right in practice.

Use Cast Steel Flasks

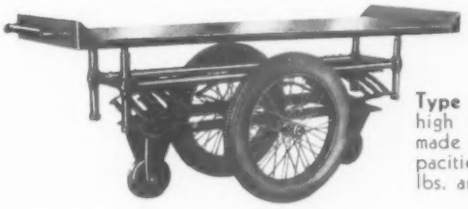
For molding purpose the patterns are parted approximately in the center and mounted on two machines in groups of eight. The part carrying the core print is molded in the drag and the part with the riser or sink head is molded in the cope which is about 2 inches deeper than the drag. Flasks are rectangular steel castings rounded at the corners and provided liberally with vent openings. The joints are planed and the guide pin holes are drilled through a jig and bushed in accordance with modern foundry practice for accuracy and interchangeability. The squeezing head on the molding machine is equipped with a number of tapered ¼-inch vent pins which insure adequate and positive venting of the sand around the patterns.

Tapered upper part of the cope pattern extends to a level flush with the top of the cope. Plunger parts attached to the squeezing head slide down over the patterns and form the openings for the risers or sink heads. In the early experimental stages when the risers were left open a tendency to slight porosity was noted when the pointed noses were machined. A remedy finally adopted was to drop a small iron plug in the top of the riser cavity. The plug rests on a shelf or shoulder inside the riser cavity. Metal is poured into the mold through a central sprue which extends a short distance in the drag to form a well. From the well the metal rises through a core right and left and enters chambers in the cope from which it is conducted into each of the group of four mold cavities. The chamber in the cope on either side of the sprue serves as a combined dirt catcher and feeder.

One of the overhead electric traveling cranes brings the ladle of molten steel from the furnace to a point in the center bay opposite the pouring station in the side bay where the molds are accumulated on the conveyor lines. Preheated bull ladles suspended from an elaborate monorail system distribute the metal rapidly. They are filled in rotation from a nozzle in the bottom of the large ladle which remains suspended from the crane until emptied. In the beginning, four bull ladles are placed in cradles on the outer ends of a cross pivoted in the center and revolving

REDUCE CORE-HANDLING COSTS

50 to 75 Percent!



Type A-27 has bench-high steel loading trays, made in 3 sizes for load capacities of 800 lbs., 1,000 lbs. and 1200 lbs.

Use CMD *Triple-Resilient*

PNEUMATIC CORE TRUCKS!

This exclusive **coil spring construction** (found only in CMD Trucks) assures maximum resilience even under light loads.

Pneumatic tires, specially designed elliptical springs and exclusive inner coil springs in the upright supports in **CMD Pneumatic Core Trucks** not only minimize core chafing and breakage but save workers' time.

The more efficient handling that is possible with CMD Core Trucks **enables one or two men to do the work formerly required of three or four.** You want the economy of CMD Trucks for your plant. Types and sizes for every core room. Write for new four-page folder on the complete line of CMD Core Trucks, Core Barrows, Bag-Holding Trucks and other foundry specialties. Write for your **free** copy now!

CMD PNEUMATIC CORE BARROW

In busy, crowded places around your foundry, this easy-to-handle CMD Core Barrow speeds-up **safe delivery** of large cores to molders.

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Manufacturers of a complete line of core-conveying equipment and foundry specialties.

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horizontally. Each ladle in turn is brought under the nozzle of the crane ladle, filled with metal and revolved to a point where it is picked up by the monorail hoist. The cycle is repeated until all the metal has been distributed. Metal from the bull ladles is poured over the lip. The steel is poured into the molds at a temperature of 2800 degrees Fahr.

While still red the castings are shaken out at the end of the conveyor line and loaded in trucks which carry them to a storage pile, where they are allowed to cool. If the gates are broken while the castings are hot, they will either break in, or leave a stump. When the castings are cold, a blow from a hammer breaks the gates off clean. The risers behave in the opposite manner. They are removed under a shear. If sheared cold they break off unevenly. They must be heated to approximately 400 degrees Fahr. to insure a clean cut. Cycle of operations after leaving the shears includes tumbling for 15 minutes, grinding, hydraulic test at 1000 pounds, annealing for 2 hours at a temperature of 1600 degrees Fahr., second tumbling, pressure blasting the inside, second hydraulic test by government inspectors, and then minute inspection for size, weight, concentricity, porosity (after two hydraulic tests!) finish and general appearance. From the shakeout to the shipping dock the castings are under continual inspection to meet 76 specification items.

Molding, coremaking, pouring and shakeout equipment and methods in the tank shoe section of the foundry, with a few minor exceptions are similar to those employed in the manufacture of the trench mortar bombs. The shoe is a rectangular casting, weight 27 pounds and cored out to a thickness of ⅜-inch. Specifications call for perfectly sound, homogeneous castings and for two absolutely straight holes in which the hinge pins are fitted. To insure the first requisite the large riser in the center of the cope also serves as the pouring gate for the casting on either side. Additional small, blind risers are set up on the outer corners of the casting. One of the favorable features of this arrangement is that when the casting is set in front of the circular saw in the trimming department, one cut removes all the heads.

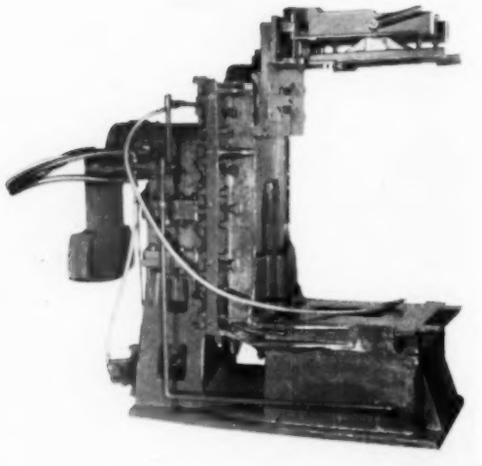
The cores are made on a core blowing machine, but since they lie in a horizontal position in the mold it is necessary to reinforce them with lengths of ⅜-inch square steel rods. These rods are placed in the corebox before the sand is blown in. The core is pierced with three vent holes in the same manner and with the same type of equipment used for venting the mortar bomb cores.

Manganese steel for these castings subjected in service to severe conditions has to conform to exacting physical and chemical specifications. The castings are heat treated in a furnace and then discharged through a chute into a quenching tank. A drag conveyor lifts them out of the tank and loads them on trucks for removal to the machine shop. Highly ingenious adaptations of standard machines for this specialized work are worthy of extended comment, but lie outside the scope of the present description, limited to operation in the foundry.

Mine Safety Appliances Co., Pittsburgh, was awarded the National Safety Council trophy at the Council's recent Chicago convention as the safety winner in the light machine shop (large) group of the Metalis section. The contest ran from July 1, 1941, to June 30, 1942, with 36 companies competing. In order to win the award, Mine Safety employes held their accident frequency rate down to 0.23 lost-time accidents per million man-hours worked. The award was accepted for the Mine Safety Appliances company by Harry Idzkowsky, its safety director.

GRIMES
MOLDING MACHINES

HAND AND POWER ROLL-OVERS FOR CORE ROOM AND FOUNDRY



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22″ Pattern Draw

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GRIMES MOLDING MACHINE SALES
1429 VIRGINIA PARK **DETROIT, MICHIGAN**

FOUNDRIES MAKE CONTRIBUTION TO WAR PRODUCTION

(*Continued from page* 71)

These three things, centrifugal castings, chill castings and heat treated or annealed castings, are tendencies that will increase as time goes on.

West Coast Foundries Use All Scrap Mixtures

By CHARLES HOEHN
Enterprise Engine & Foundry Co.,
San Francisco

SHOP practice in our foundries to a very great extent is going through the same experiences in World War II as in Warld War I. We are obliged to make first class castings using practically 100 per cent scrap materials. The secret of success under these conditions lies in the closest kind of attention to the minutest details. Shop practice must be altered to suit the materials available. Each design of casting is a separate study in itself. Old Man Experience, coupled with the latest scientific developments in materials and methods, is the surest way to achieve maximum production for this all-out war effort.

It is the policy of this company to encourage its foundry employes to take membership in the American Foundrymen's Association in order that they may have access to the latest developments in the foundry industry and thereby be in a position to understand personally what it is all about and to do a better job because of this knowledge.

Tests Show Availability Of Converter Process

By A. W. GREGG
Whiting Corp., Harvey, Ill.

AN OUTSTANDING achievement of 1942 was the exhaustive series of tests conducted at Battelle Memorial Institute to determine the relative properties of steel castings made by the side-blow converter, open-hearth and electric furnace processes. The report of this test was presented as a paper by C. E. Sims and F. B. Dahle before the A.S.T.M. annual meeting and was reproduced in the September, 1942 issue of THE FOUNDRY.

The tests showed that the long-standing prejudice against converter steel castings was unjustified and that the quality of steel castings is determined, not by the process, but by the care used in following that process.

This vindication of the converter process has stimulated the use of converters, not only in steel casting production, but also for the manufacture of alloy ingots and armor plate. There has been an extension also of the triplexing system, in which hot cupola metal is blown in a side-blow converter and then transferred to electric furnaces for alloying and distribution. One such installation recently put into operation has four side-blow converters of 6 tons capacity each. An important producer of alloy steel castings has contracted for a duplexing system in which the cupola metal is transferred directly to the electric furnace for refining and finish.

Another foundry, which produces automotive castings for war use, now is duplexing cupola metal in a pulverized-coal-fired cradle furnace. The cradle furnace permits "lip" pouring of the finished metal to a continuous conveyor line.

During 1942 several large foundries have installed equipment for hot blast for their cupolas, thus effecting considerable savings in coke and improving general operation. Interest in equipment for con-

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Its acquaintanceship with the problems of users of ferro-alloys, pig iron, coal, coke, shot and grit has steadily expanded for over 50 years of its business life.

Nine offices as points of contact with the trade, conveniently located, enable a well-trained staff to make suggestions properly and give personal attention to your orders. Get in touch with any of the 9 points today.

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trolling the moisture content of the cupola blast is likewise on the increase. A producer of piston rings for airplane engines reports very marked improvement in uniformity and quality of product since installing moisture control apparatus.

In the open-hearth field some important producers have adopted the duplexing system, using desulphurized cupola metal for about 40 per cent of the charge going into the open-hearth furnace, thus increasing open-hearth capacity by 25 to 30 per cent. This is applicable to open-hearth plants having no blast furnaces.

Needs for Cast Magnesium Brings Expansion

By L. B. GRANT
Dow Chemical Co., Midland, Mich.

THE past year has seen unprecedented developments in the magnesium industry, both in the manufacture of metal and in its fabrication into structural products. New magnesium plants have been built in 1942 in practically every section of the United States and the combined output of these plants together with already existing plants will have increased in 1942 several hundred per cent over 1941.

The magnesium industry is particularly fortunate in that all raw materials for the production of the metal are available in this country in unlimited quantities. These facts put the United States in an enviable position regarding supply of magnesium for both war and postwar uses.

Sand castings represent the major tonnage of the magnesium products based in aircraft today. This fact necessitated a large expansion of the magnesium foundry industry. New foundries were built by firms previously in the business as well as by newcomers in the field. Even these new foundries were not sufficient to meet the demand, so several large iron foundries have been converted to magnesium with a speed and efficiency typical of American industry.

The greatly accelerated demand for magnesium in 1942 parallels the tremendous growth of the aircraft industry, because magnesium is being used in ever-increasing quantities in airplane structures. It is fortunate that the magnesium industry through years of development has perfected magnesium and its products to a point where the use of magnesium in airplanes is both practical and economical.

Substitution of Materials Is Pressing Problem

By P. J. POTTER
Pangborn Corp., Hagerstown, Md.

LIKE all other equipment manufacturers, we have ever with us the necessity of making substitutions for scarce materials. Frequently the job is on the assembly floor before we know positively that we are unable to secure special steels or some special parts. To avoid the shop blockade resulting therefrom we have designated one of our engineers, who knows our line intimately, to have charge of all substitutions and he has authority to make all required changes. He not only designates and approves materials used, or any change in design, but is responsible also for the changing of drawings, specifications, and bills of material. This procedure assures quick action when substitutions are necessary and also provides correct records of every change.

Some of our cast parts are hard nickel-alloy iron, abrasive resistant, subject to severe wear, and must be frequently replaced. To conserve virgin nickel we circularized, or wired, all our customers requesting the return of the worn parts at the price designated by the OPA. Our customers have co-operated to such an extent that our monthly returns of

CLASSIFY FOR REQUIREMENTS OF CONTROLLED MATERIALS PLAN

Definitions 3 and 10—
"CONSUMED OR CONVERTED INTO SCRAP"

WAR BONDS – YES

ALSO IMPERATIVE—YOUR PART IN CONSERVING
CRITICAL METAL

YOUR EFFICIENCY RATING IS BASED ON—
"Amounts of Materials Required For Physical Incorporation In The Production of a Given Product, Including The Portion of Such Materials
CONSUMED or CONVERTED into SCRAP in the course of processing."
"RECOMMENDING APPROPRIATE ACTION TO MAKE THE MOST EFFICIENT USE OF CONTROLLED MATERIAL".

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COMPLETE Concentrating Plant
No abrasion of the metal other than—removes all oxide

MADE IN THREE SIZES—FEED RANGE—800 TO 4000 LBS. PER HOUR—
Twenty Eight Years Experience and Records To Help You Classify For Highest Rate Efficiency.

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45 WARBURTON AVE. YONKERS, N. Y.

nickel scrap equals 47 per cent of the metal shipped.

We have used quite extensively of NE steels having leaner percentages of the scarce alloys, nickel, chromium and molybdenum. We use hot rolled steel wherever possible in place of cold drawn and cold rolled steel. We are constantly reviewing our designs with a view to conserving materials and also man hours. Many parts having light loads and formerly made of steel, have been changed to cast iron.

One particular part on which there was only a compression load and which was made of 2½-inch square steel bar stock, with machined holes, has been converted to a casting with the holes cored to size.

Another part composed of one casting and three other steel parts was combined into an integral iron casting, thus saving steel and expediting production by saving numerous machine operations.

Gray Iron Foundries Must Merchandise Castings

By WALTER L. SEELBACH
Forest City Foundries Co.
Cleveland

TECHNOLOGICAL advances in the gray iron foundry industry during the last few years have been consolidated and strengthened in the year of 1942, due to the necessity of meeting war requirements.

The outlook for gray iron castings as such for the post war period does not seem too promising. This is due to the fact that new lighter metals will be available. Such metals either have been increased in strength or are entirely new developments. These lighter metals will be in much demand for items that prior to the war were made in cast iron.

In my opinion, there always will be a demand for gray iron castings, but in the light production casting work, new metals may result in some replacement. Therefore it behooves every gray iron executive to start immediate planning for the post war period so that he may be ready to do an outstanding merchandising job if he wants to keep his light production foundry in operation.

Data Is Needed on Use of Secondary Aluminum

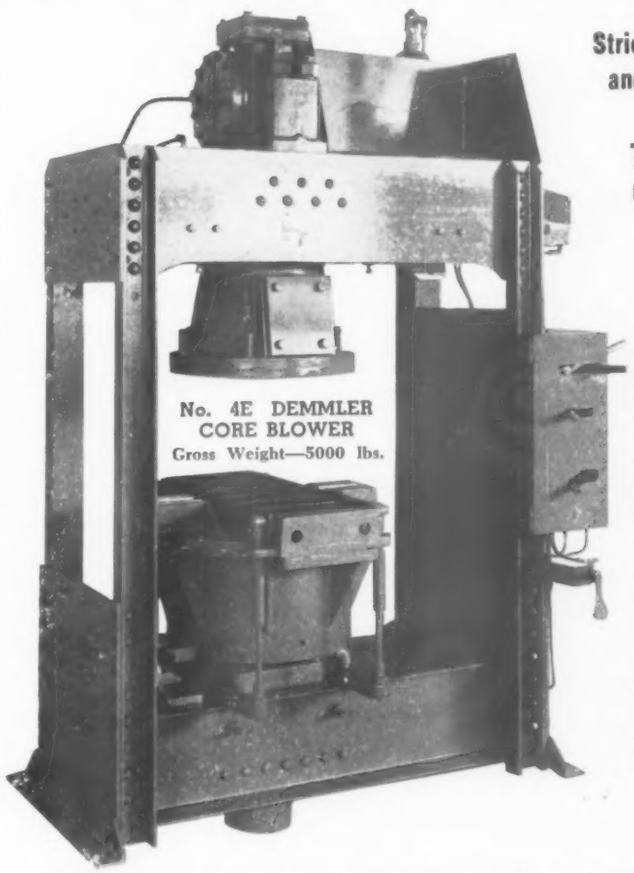
By SAM TOUR
Lucius Pitkin, Inc., New York

IN THE spring of 1941 when the aluminum situation became critical, it was evident that so-called secondary aluminum must be used in the war effort to supplement the production of primary or new aluminum. Where was this secondary to be used? The logical place is in the foundry industry. It should be used to produce castings for the war effort. What castings could be produced from it? A survey of the specifications of the various government agencies showed such stringent impurity limits that the use of secondary aluminum would be impossible.

It was necessary to start two campaigns. One to revise old specifications or issue new specifications for aluminum castings and the other to find out what alloys could be made from the secondary aluminum. Little progress was made in 1941 along either of these lines. Considerable progress has been made in 1942. Considerably more progress is possible and 1943 should show further advances.

New specifications both of the permanent and emergency variety have been adopted by some of the government services. Those of the Army Ordnance department and a few of those of the Navy department are clearly a step in the right direction. Some of the Navy department revisions and most of the revisions by both the air services give only lip service to the needs. The slight adjustments in

NEW HEAVY-DUTY BLOWER
FOR MOTOR CASTINGS WORK . . .



Strictly for BIG Cores and Fast Production

Takes Core Box up to 18" x 24"

Designed as a special blower for a leading producer of airplane motor castings, this unit is now offered as a standard Demmler blower. Features include an accurate hydraulic core box draw, table equipped with Timken rollers, 12" diameter throat opening, control mechanism totally enclosed. The height of the frame may be adapted to varying sizes of core boxes.

Reports on this new machine from users indicate that it has unusual possibilities in production of aircraft, tank and truck motor castings. At the present time we can make good deliveries, and invite your inquiries.

WM. DEMMLER & BROS. · KEWANEE, ILLINOIS

DEMMLER
CORE BLOWERS Exclusively

certain impurity limits are pure camouflage to cover the resistance to the use of secondary metal and in effect do not permit the use of such metal. As new information becomes available on the successful applications of secondary aluminum alloys, it is hoped that some of this resistance will disappear.

For the services and for industry to use "secondary" aluminum, they must know what compositions and what quantities of such compositions are available. As all this is under the control of WPB, it is natural that that agency should supply the information. Although WPB has ruled that secondary aluminum must be used for certain castings, it has failed to gather and supply information as to what constitutes this secondary aluminum. Under this situation it has been necessary for industry to go to the individual secondary smelters and get what information they can. All such information is sketchy and temporary because the secondary smelters can only say what they have in sight today and have no way of knowing what WPB will do next in connection with the routing of scrap. In spite of this condition, progress is considerable.

Castings on the move

Whisk them through the Foundry;

Zip them through the Cleaning Room.

Use the following to shorten long jobs and eliminate unnecessary ones.

LION BINDER - A strong, fast drying paste; tie wires not needed. A strong binder that bakes very fast.

EASY CLEANER CORE COMPOUND - Makes cores that clean out of the castings readily.

VULCAN BLACKING - Can be adapted to swift application; gives good surface, cleans speedily.

DUST-ON FACING - Shake it on green sand molds, close and pour. No tooling. Fast cleaning.

SUPERIOR PLUMBAGO - Rubs in immediately; doesn't "lift" the sand - - peels beautifully.

SILKOTE - Paint or spray on steel foundry cores, dry sand molds and skin dried work. Adaptable to fast application. Casting surfaces are really clean.

Manufactured only by

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PITTSBURGH, PA.

FOUNDRY FACINGS · SUPPLIES · EQUIPMENT

Makes Technical Advances In Steel Castings

By RAYMOND L. COLLIER

Steel Founders' Society of America

Cleveland

A NUMBER of important technological advances have taken place in the steel castings industry during the past year. One of the most significant developments has been the pioneering work done in centrifugally casting long tubular shapes up to 16 feet long with side walls up to several inches in thickness. The ingenious methods employed make possible the integral casting of flanges on the end of such sections, if desired. The technique would appear to be a promising one for future commercial exploitation.

The laws of directional solidification in steel castings have been studied by a growing number of foundries which have thus been able to "lick" hitherto "uncastable" jobs. Expert use of chills has accomplished seemingly impossible results. Banks of infrared lamps are being used for the rapid expulsion of moisture from dry sand molds. Specially designed broaching tools have been designed and built for high speed finishing of cored holes in castings.

There is a definite trend toward quench-and-temper heat treatments due to the impressive mechanical properties which such treatment imparts to cast steels. This development has long-range possibilities.

The new NE steels in cast form are being studied by more and more steel foundries. Scattered reports to date suggest the possibility of these steels becoming increasingly popular both during and after the war.

The well-organized work of the technical and operating groups of the Steel Founders' Society of America has gone forward in spite of heavy operating schedules which leave little free time for plant executives and technical supervisors. These group studies are resulting in improvements in quality of steel castings.

There has probably been more progress made in steel casting technology during the past year than in any similar period in the recent past.

Equipment Handles Special Ordnance Castings

By D. C. TURNBULL

American Foundry Equipment Co.

Mishawaka, Ind.

WITH conservation of materials and equipment assuming the greatest importance in our national war effort, airless blast cleaning equipment is play-

ing an exceedingly important role.

Advancements in this field during 1942 involved the development of new equipment designs for handling such products as rifles, bombs, armor-piercing shells, airplane engines, tank bogie wheels and tractor treads, armor plate and a host of other essential war materiel.

In the case of shells and bombs, it was necessary to use compressed air for blasting internal cavities because of the small end openings, but methods were devised to utilize the compressed air more economically than ever before and to blast exterior surfaces with the airless equipment. The company introduced a combination machine for shells and bombs in which both the interior and exterior surfaces can be cleaned simultaneously in a single machine, using one operator. Extreme flexibility was maintained in the design as evidenced by the fact that one standard shell machine can handle any shells from 75-mm to 6-inch by a simple change of fixtures.

The significant fact regarding these developments is that cleaning speeds have been increased as never before, space has been conserved, manpower has been reduced, and cleaning quality has been greatly improved.

Hold High Quality of Steel Castings with Less Alloys

By JOHN HOWE HALL
General Steel Castings Corp.
Eddystone, Pa.

ONE of the outstanding accomplishments of the steel foundry industry during the past year has been in the field of steel products which have to have exceptionally high strength, ductility, and toughness. Concerns with up-to-date equipment and competent technical staffs have in the past been able to make castings suitable for exceptionally severe service by employing various alloy steels, suitably heat treated.

With the growing scarcity of steel making alloys, which resulted in the development of the various NE steels, it has been necessary to reduce both the variety and the content of alloys used in the steel, and at the same time not sacrifice the high quality demanded by the conditions of service. By careful attention to all details of steel making, molding, and pouring practice, over heat treatment, it has been possible to attain the high level of quality formerly secured by more liberal use of alloys, with combinations and percentages of alloys that a year ago no one would have supposed could possibly have given steel of satisfactory properties.

Probably more progress has been made in this line during the past year, under the spur of urgent necessity than in any 5 years or more before Pearl Harbor.

Nonferrous Foundries Face Limited Supplies

By N. K. B. PATCH
Lumen Bearing Co., Buffalo

THE nonferrous foundry industry moves along with 100 per cent war demands and the problems of limited supplies of the necessary raw materials. Last year at this time the problem of aluminum was more or less uppermost with all nonferrous foundries using that metal, due to a shortage of that most strategic metal. But efforts of the past year have improved production, so that now there is not the difficulty in securing the necessary requirements of the foundry industry.

Since Pearl Harbor and the Japanese control of the East Indies, tin is the metal that is giving many headaches to the nonferrous foundry industry. The recovery of tin from scrap is being carried on much more thoroughly than ever

SERVICE TO FOUNDRYMEN SINCE 1903

PRACTICAL FOUNDRY ADVISORS

KAWIN SERVICE

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Present-day Specifications

■ We are in daily contact with all kinds of Gray Iron foundry problems, meeting new specifications, giving personal service and metallurgical advice—ferrous and non-ferrous . . . what is YOUR problem?

★ *22 technicians in our laboratories are available to render accurate test reports.*

Chas. C. Kawin Company

Chemists—FOUNDRY ENGINEERS—*Metallurgists*

CHICAGO—431 So. Dearborn BUFFALO—110 Pearl St.

before. Use of tin is limited to essential war requirements and this restriction will continue as long as the present shortage exists. Consequently, substitution of other materials for tin is being considered by all who have heretofore found tin the easy solution of their problems.

In the foundry industry, the tin bronzes are being eliminated as far as possible by the use of other materials, noticeably manganese bronze and aluminum bronze, where such bronzes will give a fair service in such substitution. However, there are many instances where copper-tin bronze is absolutely essential and no satisfactory substitute has been found.

Pearlitic Malleable Used In Ordnance Production

By J. H. SMITH
Saginaw Malleable Iron Division
Saginaw, Mich.

WITH the advent of all-out war, our products, especially pearlitic malleable, assumed real importance in industry's war assignment. Thousands of tons are being produced yearly with which to replace critical steels needed so badly for ships, planes, etc. Importance of this material in many peacetime applications, together with the advantages it offers in producing those parts, led to its adoption in many war products such as small arms, ammunition, marine diesel engines, transmission, tank and truck parts and many other applications.

This pearlitic malleable iron, produced under the most rigid technical control, was developed to provide industry with a cast ferrous product combining high yield strength, adaptability to selective hardening with good machineability, and having many other features making it comparable to steel in many qualities.

As we approach 1943 our engineering and metallurgical staffs are continually putting forth renewed efforts in developing new applications for our products in the war program, with the full realization of the tremendous task ahead of us and pledging our untiring efforts to ultimate victory.

Striking Advances Noted In Production Volume

By FREDERICK A. MELMOTH
Detroit Steel Castings Co.
Detroit

THE year has been remarkable principally for the striking advances made in volume of production. All possible effort has been bent toward the adaptation of the largest number of parts to machine production, and foundry ingenuity has been allowed full play to achieve it successfully. The result has been output of a record-breaking type with no falling off of quality, but rather a steady development of this always essential factor.

The enormous increase in the percentage of production subjected to severe specification requirements has intensified the importance of nondestructive types of testing and examination.

Technical associations have kept step by inaugurating committees solely for the study of war production problems, and the dissemination of reliable advice and assistance.

This is all the more valuable owing to the fact that many branches of the founding industries, whose products were largely devoted to normal peacetime needs, have converted their facilities to foundry products essential and vitally urgent for war requirements. Remarkable success has been achieved by many of such conversions, which will have a constantly enlarging beneficial effect on the situation where certain foundry products are experiencing demands much greater than their productive capacities.

OVENS for Casting Conditioning too!
• The highly satisfactory performance of this aluminum heat treating furnace is due to the same factors responsible for the success of Lanly Core Ovens . . .
Efficient and economical generation of heat in the Lanly Air Heater . . .
Closely controlled temperature and Lanly balanced distribution and recirculation of the heated air . . .
Lanly exceptionally well insulated housing and door.
The layout provides for quick raising of the temperature to the desired point and immediate quenching of the castings upon completion of the heating cycle.
Lanly experience embraces the designing of core and mold ovens—furnaces for heat treatment of magnesium, aluminum and gray iron castings—and various kinds of industrial heat processing units for baking, drying and curing operations.
Lay your problems before Lanly for a recommendation.
Also
HEAT TREATING OVENS
•
PAINT OVENS
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RUBBER CURING OVENS
AIR HEATERS ETC.
THE LANLY CO.
CORE OVENS
750 PROSPECT AVE.
CLEVELAND, O.

METAL, MELTING COST IN A GRAY IRON FOUNDRY

(*Continued from page* 74)

in the day, five in the first (5) block and three in the (10) block. The car numbers of each grade of pig iron used is shown in the spaces (E). This tally, tender; the cards being turned in at or record of heats, is made by the cupola man at close of each day's operations.

The *Weight, One Charge* for each kind of material, is multiplied by the total number of heats (Tally) entering the results on the bottom (Total Weight) of the card. The metals used cards are then filed, by kind of mixture.

At stated periods, usually one month, these *Metals Used* cards are moved from the file and the weights of each kind of materials shown thereon added and the total of each kind of materials shown thereon added and the total of each entered on the *used* line of the *Metal Cost* card (11510 pounds, Fig. 1).

This amount is then deducted from the inventoried weight (36,000 pounds) the remainder (24,490 pounds) is multiplied by the cost per pound ($0.0109) and the resultant amount ($266.94) entered on the *Balance* line and in the *Cost* column of the metal cost card, Fig. 1. This amount is then deducted from the cost ($392.30) of the original inventory, entering the remainder ($125.36) on the *Used* line and in the *Cost* column of the metal cost card, Fig. 1.

The pounds used (11,510) is multiplied by the price per pound ($0.0109) to prove all calculations concerning the transaction. In this example the result of the multiplication is $125.46, which is ten cents more than the *Used* cost shown on the metals cost card. This variance is caused by carrying the cost per pound in the original inventory entry to four decimal places only. The variance amount is so small in proportion to the total involved that it is disregarded.

The same procedure is employed where purchases are recorded on metal cost cards, Fig. 3. Subsequent entries for metals used are made in like manner until the metals originally recorded on the metal cost cards have been exhausted.

Records and calculations of costs for alloy purchased scrap, coke and flux are made in the same manner as for pig iron. The sum of all calculated costs of purchased metals, used in the month (shown in *Cost* column Fig. 3), is credited to Purchased Metals account, Fig. 2. The value of purchased metals on hand is then determined as follows: Balance at first of month $45,164.10 plus purchased metals received during month $20,942.58 equals total of $66,106.68. During the month $39,006.00 was used leaving a balance at close of month of $27,100.68.

Many foundries do not remelt gates, sprues, over iron and defective castings the next day after they are produced. This practice suggests the maintenance of a ledger account, Fig. 8. This account was started with a balance of $500.00 representing the value at the current market price of this grade of home scrap on hand at the start of the system.

During the month there was $368.00 worth of home scrap used and $588.77 worth produced. If no consideration is given to accounting for home scrap, the balance of $720.77 worth on hand at Sept. 30 would be taken into metal cost for the month, causing overstatement of costs of individual jobs produced.

At the close of the month's operations a statement of metal cost is made segregated into classes of metal produced as shown in Table I. In the preparation of this statement the classes of metal produced are designated as mixture numbers. The *Metal Used* card, Fig. 7,

"CITIES SERVICE DELCO FOUNDRY PRODUCTS FOR ALL USES"

Untouched photograph of cores and castings made by Watkins, Inc., of Wichita, Kansas. Some of the cores and castings shown are for V-Pulleys and are cast 1/64" of specifications. Watkins, Inc. are 100% users of Cities Service Delco Core Oil # 26 and used Cities Service Delco Foundry Products in all of the above shown castings and cores.

CITIES SERVICE OILS
ONCE-ALWAYS

5 REASONS FOR USING CITIES SERVICE DELCO FOUNDRY PRODUCTS

First: The very complete line of core oils manufactured for the many exacting uses.

Second: Uniformity of each shipment. Once an oil has been used for a certain operation, the foundry can depend that each delivery will run uniform; this point cannot be stressed too strongly.

Third: Only the cleanest of ingredients are used in the manufacture of Cities Service Delco Core Oils. This means less smoke, better working conditions in the boxes, etc.

Fourth: The oils are made with consideration of their application, whether they are to be used for Gray Iron, Malleable, Steel, Semi-Steel, Bronze, Brass, Magnesium or Aluminum.

Fifth: It is our policy to maintain the highest standard of quality in the manufacture of Cities Service Delco Core Oils, and not substitute inferior ingredients to secure lower cost.

CITIES SERVICE OIL COMPANY

OFFICES IN CHICAGO, CLEVELAND, DETROIT, ST. PAUL, CEDAR RAPIDS, KANSAS CITY, TULSA, FORT WORTH, SHREVEPORT, MILWAUKEE, TORONTO, NEW YORK

recording the metals used during the month are sorted to mixture numbers and the weights of each kind of metals shown thereon are added to determine the total used. For example, the several kinds and grades of metals used in producing mixture No. 1 for the month are shown in *Mixture No.* 1 column of the foregoing statement.

The several kinds and grades of metals used in producing mixture No. 2 for the month are shown in the *Mixture No.* 2 column of the same statement, *Mixture No.* 3 in the third column and so on for all mixtures. The pounds of metals of each kind and grade used in the several mixtures are summarized and the totals thus obtained entered in the *Total* column of the statement. The percentages of each kind and grade of metal used to the total melt for each grade is shown for statistics only and may be omitted so far as costs are concerned.

The daily records of pounds of good castings and home scrap produced are summarized and recorded on the statement under the caption of *Produced.* The difference between the sum of good castings and home scrap produced and the total melt is the melting loss which in this instance is 3730 pounds or 4 per cent of the total iron melted.

Applying Metal Costs to Individual Castings: The metal costs per pound shown previously are used in calculating costs of castings of various shapes, sizes and compositions of melted metals. Calculations taken from Fig. 5 show the following: Iron in Mold—1231 pounds @ $0.0112 or $13.78; Home scrap—148 pounds @ $0.0080 or $1.18; Melting loss—73 pounds; Good castings—1010 pounds at a cost of $12.60.

If the metal costs by different mixtures were disregarded and the calculating factor be cost per 100 pounds of good castings (a method commonly employed) produced the factor would be obtained by dividing the total cost of metals used in all mixtures ($1861.) by the pounds of good castings produced (116,270 pounds) or $0.0161 per pound. Applying this factor, the resultant cost figure would be 1010 pounds of good castings multiplied by $0.0161 per pound or $16.26, a variance of $3.66. Hence, the total cost ($16.26) divided by good castings (1010 pounds) gives the cost per pound ($0.0124) and the cost per 100 pounds is $1.24.

Melting Cost: The schedule shown in Table II and description following explain the method of arriving at the cost per 100 pounds of metal melted:

(1) The replacement values of land, buildings and equipment are listed on the schedule; land being the value of land occupied by rooms used for melting and the yard used for storing and handling metals and melting supplies; buildings being the value of buildings used for melting and storing melting materials; equipment being those items used only for melting.

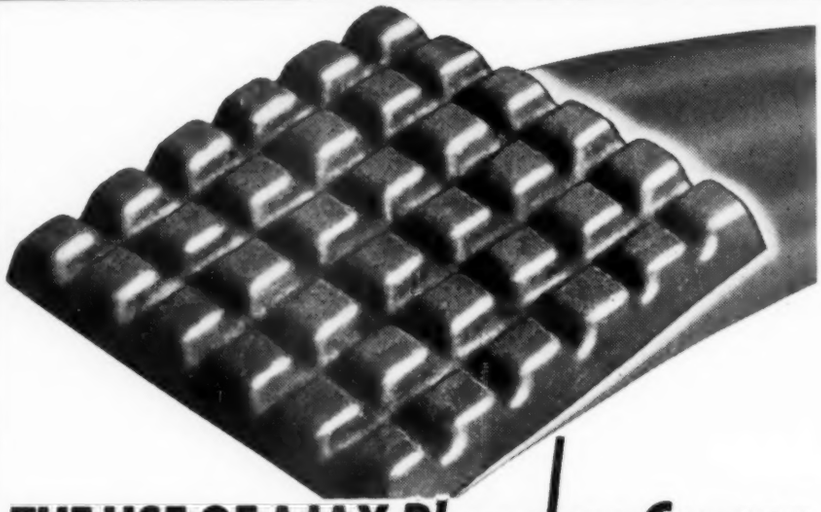
(2) The several classes of inventory being the actual cost value as determined by perpetual inventory records at the close of the accounting period. (Cost accounting and not fiscal year).

(3) The estimated life (expressed in years) for buildings and each class of equipment are entered in the second column of the schedule.

(4) The replacement values of buildings also each class of equipment are divided by the estimated life, the resultant figure for each being entered in the last column on the right of the schedule. Material inventories are not depreciated.

(5) Depreciation is the total of the calculated amounts shown in the right hand column of the schedule.

(6) Property taxes is the portion of the total assessments levied on land, buildings, equipment and inventories: (a) land in ratio to square feet occupied; (b) buildings in ratio to square feet



THE USE OF AJAX *Phosphor-Copper*

Send for booklet
"INGOT METALS OF TODAY"

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Ajax Tombasil
Ajax Plastic Bronze
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Ajax Phosphor Bronze
Ajax Red Brass Ingots
Ajax Manganese Bronze
Ajax High-Tensile Manganese Bronze
Ajax Golden Glow Yellow Brass
Ajax Nickel-Copper 50-50%
Ajax Manganese Copper
Ajax Aluminum Alloys
Ajax Phosphor Copper
Ajax Silicon Copper
Ajax Nickel Alloys
Ajax Phosphor Tin

NOTE

*"Proper Melting Decreases Foundry Losses," contains interesting data. Also, the booklet, "Nonferrous Ingot Metals of Today." Write for both of these. They are free.

Successful foundrymen deoxidize or "clean up" molten metal by a scientific method worth using *as indicated:*

They use phosphorus . . expertly . . in the form of "Ajax Phosphor-Copper" . . added as the crucible is removed from the furnace . . for virtually all brass and bronze alloys.

In notched waffle sections, or in shot form, Ajax 15% P-Cu does its work at .01% (1 oz. per 100 lbs.). Introduced, and having time to react when stirred with a whirling motion of the skimmer, it causes oxides to rise for effective removal by skimming from the surface. It is best to avoid phosphorus build-up from back stock.* . . If you use phosphorus these days, use Ajax Phosphor-Copper (useful also in producing your phosphor bronze).

THE AJAX METAL COMPANY
ESTABLISHED 1880 PHILADELPHIA

ASSOCIATE COMPANIES: AJAX ELECTRIC FURNACE CORPORATION, *Ajax-Wyatt Induction Furnaces for Melting*
AJAX ELECTROTHERMIC CORPORATION, *Ajax-Northrup Induction Furnaces for Melting, Heating*
AJAX ELECTRIC COMPANY INC. *Electric Salt Bath Furnaces*
AJAX ENGINEERING CORP., *Aluminum Melting Induction Furnaces*

occupied; (c) equipment in ratio to total replacement values of all equipment used; (d) inventories in ratio to all inventoried current assets.

(7) Property insurance is the portion of the total premiums paid for protection of the plant and inventories; (a) buildings in ratio to square feet occupied; (b) equipment in ratio to total values of all equipment covered; (c) inventories in ratio to all inventoried current assets.

(8) Interest on investment is the total investment ($16,462) multiplied by 5 per cent (estimated to be obtainable if the same amount were loaned out on real estate or other sound investment). The result of this calculation being entered on the schedule.

(9) The annual charges for depreciation ($629), property taxes ($85), property insurance ($32) and interest on investment ($823) are added and the total shown as "Investment Costs, one year." This amount is then divided by 12 to reduce it to one month ($131). (The cost accounting period).

(10) Power is the portion of the purchased electric power bill for the month.

As it is not usually practical to meter the power used in each of the foundry departments, the power cost here shown is the result of first, charging an estimated amount of the power bill to lighting. This amount is distributed to the several departments on the basis of wattage of lamps in each department multiplied by the estimated time lighted.

After deducting the lighting charge, the balance of the power bill is distributed to the several departments on the basis of rated horsepower in each department multiplied by the estimated time each motor is run.

The sum of the lighting and power amounts distributed to melting is made a part of this schedule.

(11) Repairs include all materials and labor costs in maintaining: (a) buildings used to house repair materials; (b) building containing cupola and charging floor; (c) railroad sidings and other facilities for handling materials; (d) cupola relining; (e) other equipment used in connection with melting and delivering metals to molding floors.

Materials and labor charges that are of a semi-permanent character, but not large enough to capitalize, are spread over several cost periods so that any current month's costs may not be overstated.

(12) The cost of supplies consumed within a cost period is charged to the operating cost of that period. The cost of supplies purchased in larger quantities than required in the same cost period as received, is charged to supply inventory and charged to melting cost of the periods when used. These charges may be determined in two ways, as desired: (a) Maintain a perpetual inventory record to which is charged the purchase cost of the supply, and credited by means of a shop requisition, with the cost of the supply actually used. (b) To the value of inventory of each item at the beginning of the cost accounting period, add the cost of the same kind of material received; from this total subtract the cost value of the inventory at the close of the cost accounting period, the remainder represents the cost of the supply used.

(13) Supervision is the cost of supervising the activities of others, and is of two classes: (a) director or the foreman and assistants whose authority extends only to those engaged in producing iron and distributing it to the molds; (b) indirect, or a share of management salaries fairly chargeable to melting activities.

Direct supervision can be easily determined and charged to melting cost. Indirect supervision charges are more difficult, however, sensible analysis allows the determination of a fair charge to melting costs.

YOU CAN PIN DOWN THESE

FACTS

ABOUT **AQUA-BOND No. 310 LIQUID CORE BINDER . . .**

● **FASTER BAKE**—An emulsified oil sets more quickly with oven heat. Just enough heat to break the emulsion gives the binder an "initial set."

● **LOW GAS**—To the extent that water is contained in an emulsion there is less organic material to be burned out on pouring. Your laboratory will confirm.

● **QUICK COLLAPSE**—An emulsified oil bonds at the contact points of the sand more like bridge work than in the form of a fill. Heat can get into this type of core faster and will burn out the bond further back.

● **STRAIN PROOF CASTINGS**—Metal can be thinly laid against this type of core and the bond will burn out effectively. Aqua-bond No. 310 has proved a cure for hot cracks in numbers of cases.

● **UNIVERSAL USE**—It is now in service with steel, gray iron, bronze, aluminum, and magnesium.

Core UNITED Oils

More facts can be furnished if you write us.

UNITED OIL MFG. COMPANY

ERIE, PENNSYLVANIA

(14) Clerical costs consist of wages or salaries of timekeepers and other individuals while engaged in payroll calculations and preparing cost statistics concerning melting. The wage of individuals spending their entire time for the melting department is charged to melting costs, also a fair portion for this department of other employes' wages whose duties concern pay roll and costs.

(15) Time spent on the various kinds of work in the melting department is recorded on a "Melting Department Labor" sheet, Fig. 6. This record is made by the foreman of the melting department and covers one day's operations. The cost clerk calculates the labor costs for each of the time entries, bringing the total of column down to the "total" line at the bottom of the report. Included in this report is the time of individuals, regularly employed in other departments, who assist in pouring the iron into molds. The labor cost of unloading materials is charged to the cost of the materials affected. Maintenance and repair costs are made a part of the "Repairs" charge on the schedule. Other department labor is represented as such on the departmental cost schedule.

Note the arrangement of the labor report to allow for lapping the daily sheets so that the totals only are visible. This lapping arrangement is economical to operate and at the same time reduces the possibility of errors, caused by adding amounts in one column that should be included in another total.

(16) Employe taxes and insurance consist of federal and local taxes levied on payroll; accident insurance premiums; federal insurance paid on payroll; and any other payments related to the company payroll. Some of these payments are made in different cost accounting periods than the period in which labor is expended. This necessitates calculation of these charges by multiplying the labor cost for the current cost accounting period by the established rate for each class of tax or insurance. Otherwise the departmental cost figure would be too high in periods when actually paid and too low in periods when the iron is melted.

(17) There are some expenditures of a general character, caused by the melting department, that are entered to this schedule as miscellaneous expenses.

When all the costs have been entered to the schedule, the several cost entries, commencing with investment costs for one month ($131), are added bringing the total down to the "Total Overhead of Operating Cost" ($1408) line.

The total overhead or operating cost amount ($1408) is then divided by the pounds of metal (500,000 pounds) melted, resulting in the melting cost per 100 pounds (28 cents) which is used in calculating melting costs of the several castings produced.

In applying melting cost to individual castings, the weight of iron in the mold (either estimated or actually weighed) is multiplied by the melting cost per 100 pounds as indicated in Fig. 5. Weight in mold (1231 pounds) times cost per 100 pounds ($0.28) equals total cost ($3.45). Total cost ($3.45) divided by good castings (1010 pounds) gives cost per pound ($0.0035) or per 100 pounds ($0.35).

Appoints Committees

Committees for the National Safety Council recently have been appointed. Members of the foundry committee include: John P. Leonard, Blawknox Co., Pittsburgh, chairman; H. S. Simpson, Caterpillar Tractor Co., Peoria, Ill. The foundry industry is represented on other committees of the council, M. W. Dundore, Beloit Iron Works, Beloit, Wis., being a member of the publicity committee and F. G. Bennett, Buckeye Steel Castings Co., Columbus, O., and Irvin A. Brinkman, Mackintosh-Hemphill Co., Pittsburgh, members at large.

A-1-A
PRIORITY ON PERFORMANCE

Built-in Motor Drive with Cooling Unit all Mounted on Steel Base

Throughout the many years of SCHRAMM operation they have been tops in performance; so now when economical, dependable and speedy performance is necessary in the present Victory drive, SCHRAMM is prepared to answer the call.

SCHRAMM Compressors are designed for heavy-duty, continuous service and will perform such service with least up-keep and operating costs. Units are light, compact and easy to handle, reducing headroom and floor space requirements.

BUILT IN SIZES FROM 50 TO 600 CU. FT. DISPLACEMENT

Write for Catalog 42-S

SCHRAMM, INC., WEST CHESTER, PA.

SCHRAMM Air Compressors

SPEEDS PRODUCTION OF BRASS CASTINGS

(*Continued from page* 79)

within easy reach of the machine operator. When loaded the rack mounted on small wheels is pushed into a gas fired oven and replaced by another. The cope side of the corebox then is placed on another dryer and the cycle is repeated. The dried cores later are removed from the oven and placed on the long table shown in Fig. 9. The cores are lifted out of the dryer shells and stacked in the wood frames shown to the left in the same illustration. They are then transported as required to the various molding stations and placed in the molds. The dryer shells are returned to the vicinity of the core blowing machines.

In accordance with the usual brass foundry practice of tilting the molds to some extent, the lines of roller conveyors extending from the molding stations at one side of the shop to the wide gangway on the opposite side, are set at an angle 10 degrees from the horizontal. With the molds in pouring position, the sprue is at the high end. Cope and drag are steel flasks with a reinforcing rib around the center of each and with close fitting guide pins to insure a perfect match when the mold is closed. With ample furnace, ladle and crane capacity, each conveyor line is designed to hold the hourly output of the molder.

Clamp The Molds

The outer part of the conveyor is equipped with 10 ingenious and patented clamping devices, which eliminate the laborious drudgery of shifting weights from one lot of poured molds and placing them on another lot. The number 10 was selected because that is the number of molds that may be poured from one ladle of metal. The idea is an adaptation of the familiar goose neck or *old man* employed by metal workers for holding a drill worked by a hand ratchet. The lower end of the device is bolted permanently to the outside lower edge of the conveyor frame. The upper part is bent over and attached to the cover plate for the mold. When not in service, a leaf spring holds the plate at sufficient height to allow the mold to go by on the rollers. When the mold is in position for pouring, the plate is pulled down by a hand lever and cam until it engages the top of the cope. When the mold is poured, a single pull up on the lever releases the plate and lifts it out of the way. The mold then is pushed to the end of the conveyor, and on to the shakeout grating.

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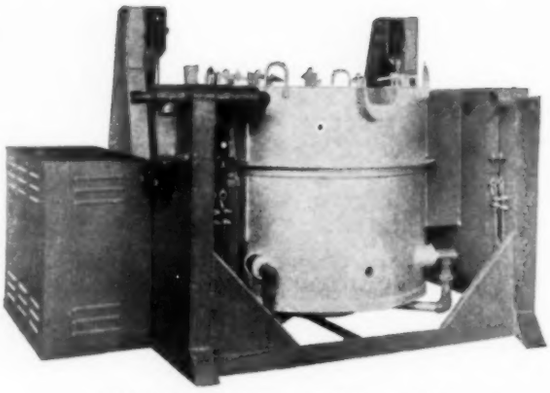

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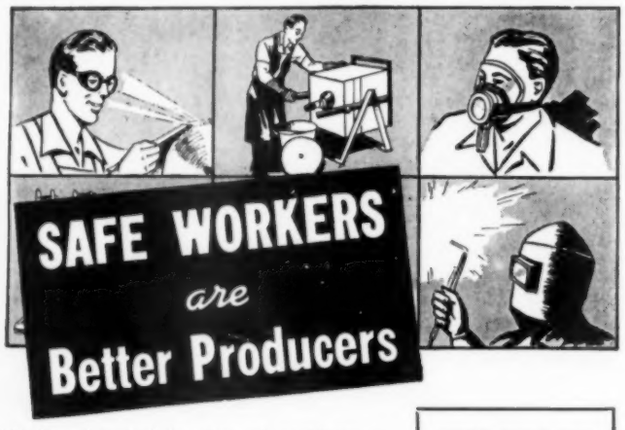

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naces in groups of three are set up back to back with a monorail line above each group. Suitable switches in each of the main lines divert the ladle to a piece of curved track that spots the ladle accurately under the spout of any selected furnace. The molding department is spanned by two light cranes suspended from rails which extend from end to end of the building over this area. The ladle trolley coming from the furnace is transferred to the crane which may be spotted above any of the narrow gangways between the rows of molds.

Investigate Iron at High Temperatures

(*Concluded from page* 75)

Contact with these industries will be made as rapidly and thoroughly as possible, but a really satisfactory study can be made only if leaders within these industries will volunteer such information as they have available. It is expected that accurate information as to the suitability of present day quality cast iron for applications at elevated temperatures (in excess of 450 degrees Fahr.) will be of prime interest to industries now hard pressed for materials and equipment subjected to such conditions. The successful substitution of cast iron should go far to speed up deliveries of many types of equipment. The cast iron foundrymen, of course, should find a further incentive to co-operate in the fact that such substitutions would permit them to share more completely the responsibilities of producing essential war material.

Information should be sent to either:

T. E. Barlow, 2440 Book Building, Detroit, or

C. O. Burgess, 4625 Royal Avenue, Niagara Falls, N. Y.

A.F.A. Suggests Study

The study of the possibility of increased utilization of cast iron in high temperature applications was suggested by the High Temperature Properties of Cast Iron committee of the American Foundrymen's Association. The study, which is being sponsored by the War Metallurgy Committee, of which Clyde Williams is chairman, will be under the immediate supervision of Dr. A. E. Schuh, research supervisor on cast metal for that committee. A subcommittee of the A.F.A. High Temperature Properties of Cast Iron Committee, consisting of R. J. Allen, Worthington Pump & Machinery Corp., Harrison, N. J., as chairman; R. G. McElwee, Vanadium Corp. of America, Detroit; J. S. Vanick, International Nickel Co., New York; and Max Kuniansky, Lynchburg Foundry & Machine Co., Lynchburg, Va., is acting in an advisory capacity.

THEORY OF SHRINKAGE IN GRAY CAST IRON

(*Continued from page* 81)

on the balance in air and in water to determine their weights and volumes. (The weight in water subtracted from the weight in air gave the weight of water displaced by the block. This weight of water divided by the density of water at the temperature of the determination gave the volume of water displaced which was equal to the volume of the cast iron cube.) Each cube was then sectioned through the center to determine the shape and condition of the shrinkage cavity and a 1-inch cube taken from one of the bottom corners was prepared and surface ground on all sides. The density of this 1-inch cube was determined actually on a precision balance in the chemical laboratory by the Archimedes principle. This density was accepted as the density of sound iron throughout the cube. Using the values obtained from these determinations the "void volume" was calculated.

Below are outlined some of the results obtained from a series of experiments designed to determine the effects upon the shrinkage cavity of changes in chemical composition and pouring temperature. This series of experiments was conducted using a base composition of the following analysis: Carbon 3.25 per cent; manganese 0.60 per cent; silicon 2.25 per cent; sulphur 0.12 per cent; phosphorus 0.12 per cent; chromium 0.30 per cent; copper 0.12 per cent; molybdenum 0.70 per cent, and nickel 0.16 per cent. In every case the heat was made up from a synthetic charge, superheated to 2800 degrees Fahr. and cooled to 2600 degrees Fahr. before it was poured. Except for one variable in each case, the heats were charged and run according to one schedule, identical throughout.

Table II

Differences in Volume

Block No.	1 x 4 x 4-in. cube c.c.	1 x 1 x 1-in. cube c.c.
2475	0.19	0.98
2462	0.21	1.46
2464	0.67	1.63
2466	2.25	2.9

1. In the range 0.01 to 0.74 per cent, phosphorus was found to increase the "void volume" as shown in Table I.

2. In the range 0.52 to 1.32 per cent, manganese showed a decrease in void volumes as it increased from 0.52 per cent, to approximately 1.00 per cent, after which an increase in this element resulted in an increase in shrinkage of comparatively small order of magnitude.

3. Deoxidizers, such as ferrosilicon, aluminum and zirconium, tended to increase porosity.

4. With this particular composition, varying the carbon content from 3.01 to 3.44 per cent and silicon from 1.39 to 2.85 per cent did not affect materially the void volume, nor did increasing the sulphur content from 0.04 to 0.15 per cent show any marked variation.

5. Increasing the pouring temperature from 2400 degrees Fahr. to 2850 degrees Fahr. produced a pronounced increase in void volume as shown in Table I.

While this 4-inch cube casting may duplicate effectively the conditions found in a certain location of a large motor block, it must be recognized that the actual conditions of solidification are not identical. The test casting would probably be a better criterion for the behavior of different compositions when cast in heavy sections, where the temper-

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ature gradient from the mold wall to the interior of the casting is large. In this large casting, beside the contraction of the iron due to the volume change from the pouring temperature to the solidus, there is also the contraction of the outer solidified shell due to normal thermal contraction as the metal cools. This condition often takes place while the interior is still in the liquid condition and in some cases the rate of contraction of the solidified shell is enough faster than the rate of solidification that the interior is actually subjected to a high pressure and the weakest part of the wall, usually at the top of the casting, bursts, forcing some of the metal at the interior to be exuded at the surface, forming beads or "peas".

Showed Shrinkage Cavities

This phenomenon is often referred to as liquidation. Several of the blocks shown in the illustrations exhibited this condition. However, it will be noted that although this phenomenon had taken place, the interiors of some of the blocks contained shrinkage cavities, indicating that there came a time when the pressure was reduced and the solidification took place under conditions conducive to the formation of voids. It may be that the reduction in pressure at the interior was the result of the allotropic change of the solidified iron at the surface from the gamma phase to the alpha phase, a transition accompanied by the expansion of the outer shell of metal. In other words, the center of the cube may have solidified after the outside shell had transformed to pearlite.

Our observations of the solidification of inadequately fed 4-inch cubes indicated that the first iron to become solid was the metal next to the sand walls of the mold as would be expected. However, as soon as part of the metal next to the mold solidified, there was enough contraction to cause the top surface to recede from the cope slab and thereafter the top of the casting cooled more slowly than the four sides and the bottom. Depending upon such factors as the strength of the iron at elevated temperatures, the differences in the rates of solidification between the metal at the top and that adjacent to the mold at the other faces of the cube, and perhaps the degree of undercooling, the top of the casting would sink varying amounts as solidification progressed.

In some cases there would be a slight concavity of the entire top surface; other times there would be deep craters formed which would only effect part of the top surface. These conditions are shown in the illustrations. In our experiments there was apparently no correlation between the sink at the top of the casting

and the void volume of the casting. In the covered mold the shrinkage defect at the interior of the casting was always above the horizontal plane of symmetry and nearly equi-distant from the four sides.

When the cope slab was removed from one of the molds the top of the casting, now exposed to the air, cooled more rapidly than the bottom. There was very little sink at the top surface and the shrinkage cavity was forced to a position below the horizontal plane of symmetry. This experiment showed clearly the effects of cooling rates and temperature gradients upon the formation of the shrinkage cavity.

Because the calculated void volume for some of the cubes cast for these experiments indicated appreciable cavities, yet saw cuts through the cubes failed to reveal cavities which could be seen by the naked eye, a more comprehensive test was conducted on four additional cubes. After casting and allowing the cubes to cool to room temperature, they were cleaned and their weights and volumes were determined. Each cube then was sectioned to produce a slab 1 inch thick, 4 inches high and 4 inches long, consisting of one side of the cube. The density of this slab was determined and the value obtained was used to determine the void volume of the 4-inch cube. This was compared with the void volume computed when the 1-inch cube, taken from a lower corner, was used as a representative of the sound iron. The two values obtained for each 4-inch cube are tabulated in Table II.

Densities Determined

Eleven other 1-inch cubes representative of each position in the larger casting were prepared and their densities were determined. These experiments indicated that the density of the iron varied for different positions in the casting, and in most cases the densities of the other cubes were less than the density for the corner cube. Part of the value which was formerly regarded as void volume, therefore, could be attributed to a reduction in density in other positions in the 4-inch cube.

The 1 x 4 x 4-inch slab was more representative of the sound metal in the cube, and the value for void volume determined by using the density of this slab, as the density of sound iron, produced results which appeared to be more in agreement with observations made from the cross sections of the cubes. However, for the four cubes in question, both methods placed them in the same order. In the two cases where the shrinkage cavity was sufficiently large to be visible to the naked eye, the

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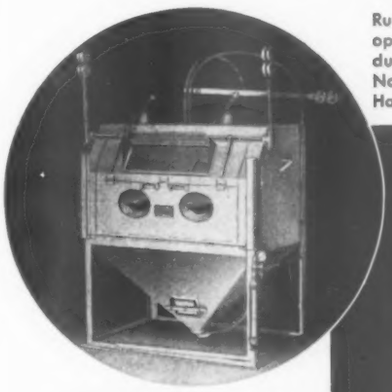

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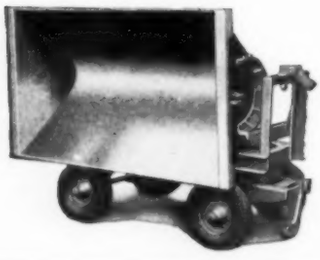

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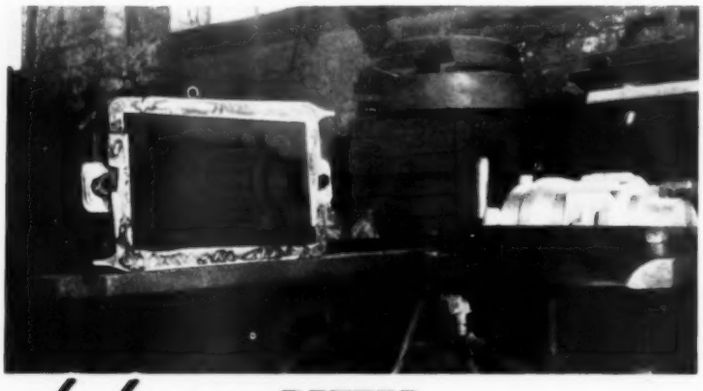

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1-inch cube whose edge corresponded to the vertical line of symmetry of the 4-inch cube, and whose base lay in the horizontal plane of symmetry, possessed the lowest density. This was expected since this cube contained part of the shrinkage cavity.

In two of the 4-inch cubes which did not exhibit visible porous sections, however, this same 1-inch cube showed a density nearly equal to the density of th bottom corner cube. In one case the corner cube was actually less dense than the interior cube referred to. Since this phenomenon has been known to occur in only two blocks, it is difficult to draw any conclusions or develop any theory regarding its presence at this time. However, it is suggested that the thermal contraction of the solid walls of the exterior of the cube may exert a high pressure on the molten metal at the interior as it solidifies and thereby may increase the density of the resulting solid iron at this location.

Specific problems in shrinkage found in different castings have been dealt with by others in papers devoted to such items as proper position of casting in the mold, gating, placement of risers, correct mixtures of molding sands and adjustment of moisture content, so these will only be mentioned here because of their effects on temperature gradients and the direction and rate of solidification.

To Prevent Shrinkage

After the mold has been made correctly, the foundryman is faced with the production of a sound casting possessing specified hardness and tensile properties with perhaps a desired microstructure. In order to achieve the desired specifications he may adjust his carbon-silicon ratio and make certain alloy additions. Considering the theoretical aspects of shrinkage, the following variations may be made to reduce the tendency toward shrinkage in certain locations of the casting which possess the least perfect feeding conditions:

1. *Reduction in elements which tend to increase the freezing range,* particularly those that substantially lower the eutectic temperature. While phosphorus has always had the reputation of increasing the castability of an iron it does so by materially reducing the eutectic temperature, thereby permitting the iron to remain fluid a longer time at a given cooling rate. However, it is this effect which makes a high phosphorus iron more subject to shrinkage defects, particularly in large castings with heavy sections. For this reason it is recommended that the phosphorus content always be held as low as possible in castings subjected to heavy pressures.

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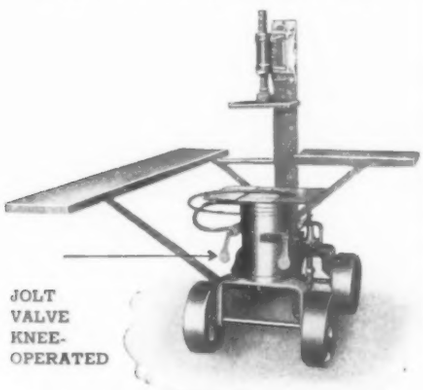

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2. *Reduction in pouring temperature.* By reducing the pouring temperature as much as possible, temperature gradients may be reduced within the casting and freezing may proceed uniformly since the interior of the section will not have so much heat to dissipate before solidification begins.

3. *Gating through light sections and risers.* Gating through light sections and sometimes even risers aids materially in reducing steep temperature gradients and permits the riser to be a source of liquid metal for a longer time due to the heating of the sand of the mold by flowing a large volume of molten metal past it. These methods are dealt with by M. A. Scott in a paper entitled "Production of Uniform Dense Structures in High Test and Alloy Iron Castings—Effects of Temperature and Sand Adjacent to Gates and Risers", presented before the A.F.A. in 1939.

4. *Proper control of pouring rates.* The rate at which a casting is poured tends to influence temperature gradients. It is necessary to compromise on this factor in order to pour the casting as slowly as possible to reduce the temperature gradients, and perhaps provide liquid metal to fill voids already formed by solidification shrinkage, and yet fast enough to prevent mis-runs.

5. *Use of Chills.* Chills may be used in certain locations of molds to hasten solidification in particular sections so that they may be fed by molten metal from adjacent portions of the casting which may be in more favored positions to be fed by risers or still heavier sections.

This discussion concerned with the theory of shrinkage has by no means exhausted all of the possible angles of approach to the problem. It has been presented with the hope that a brief review of some of the aspects of the phenomenon and some experimental data may provoke further thought and research which will eventually develop theories and concrete recommendations enabling the foundryman to exert full control over conditions which have been the cause of much difficulty in the past.

This is the second and concluding article from a paper presented by the author at the 1942 annual convention of the American Foundrymen's Association held in Cleveland. The first article appeared in the December issue.
THE EDITORS

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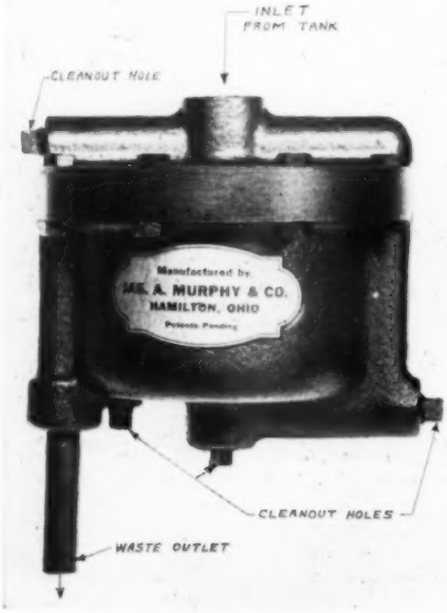

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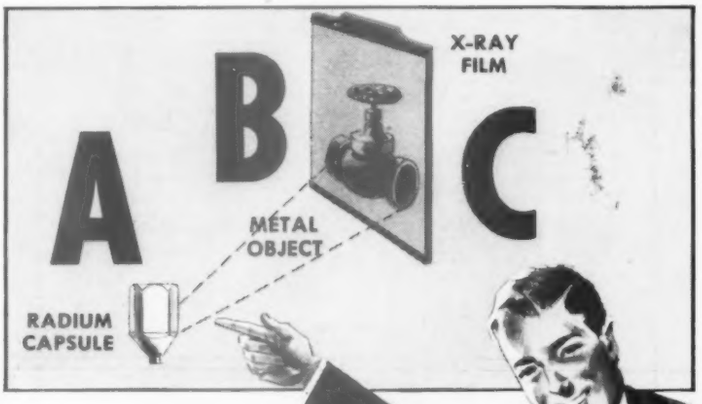

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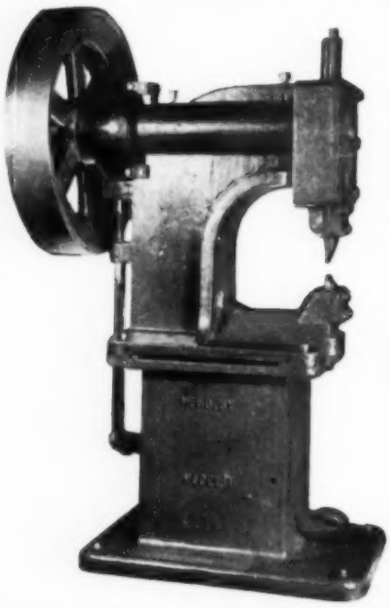

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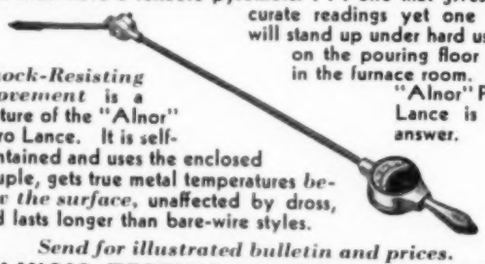

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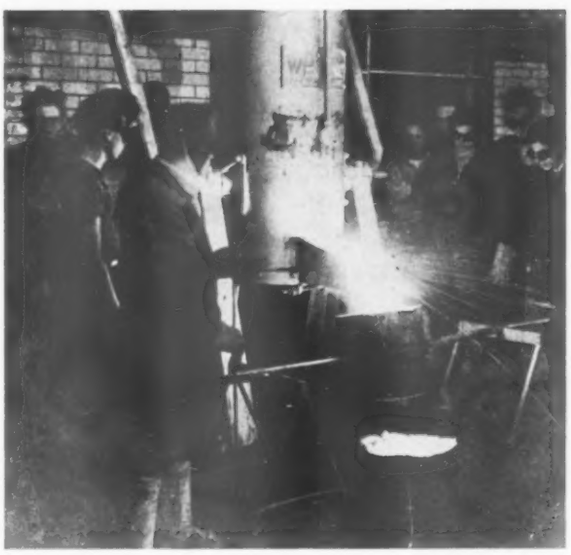

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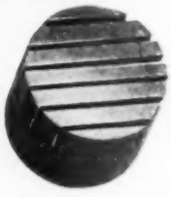
SMILLIE  VENTS

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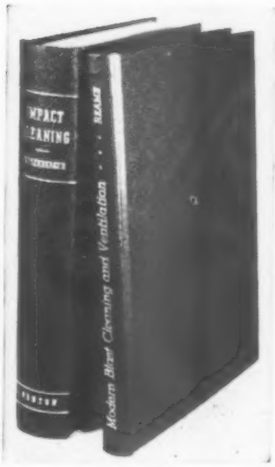

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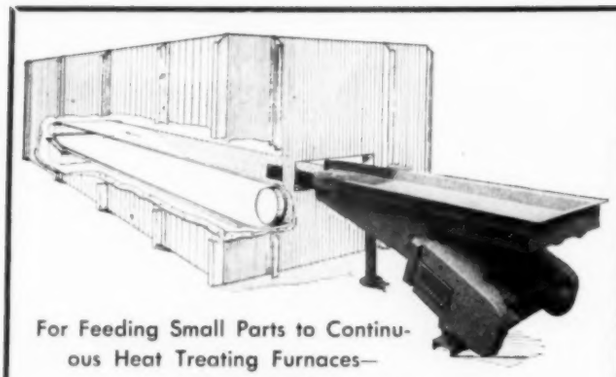

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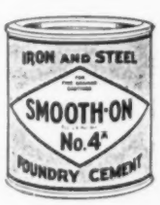

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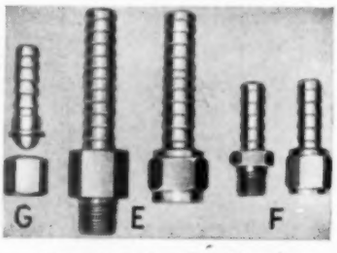

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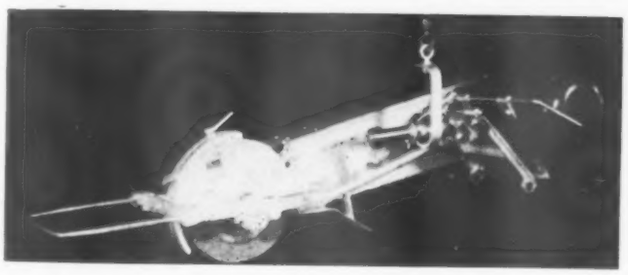

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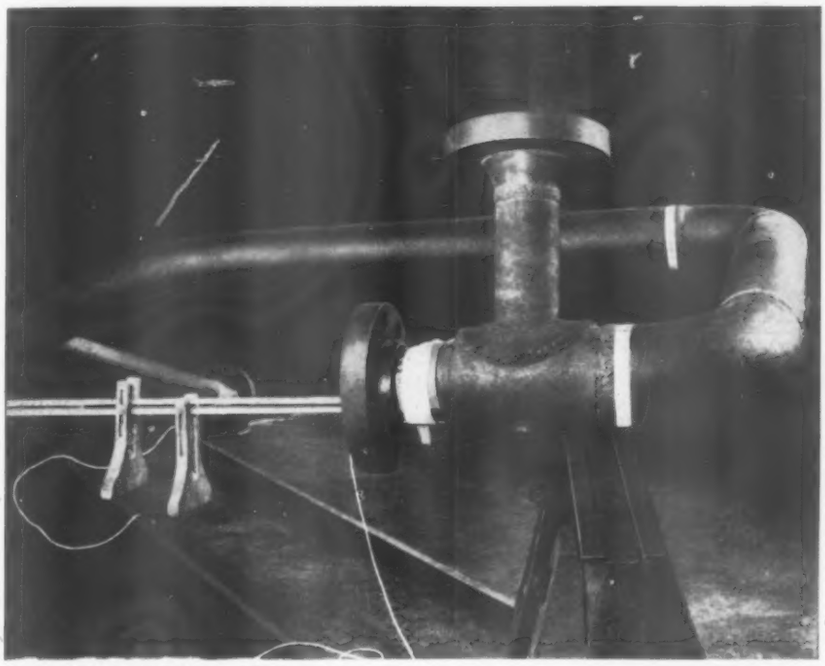

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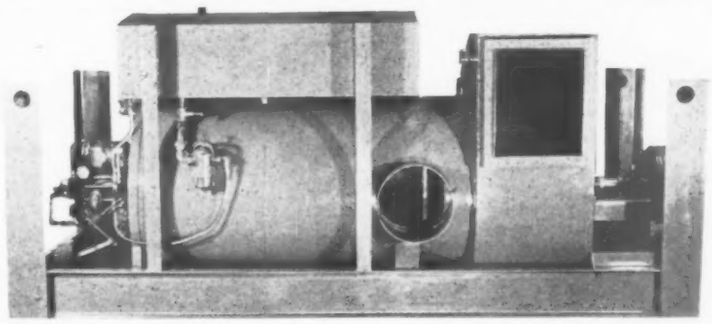

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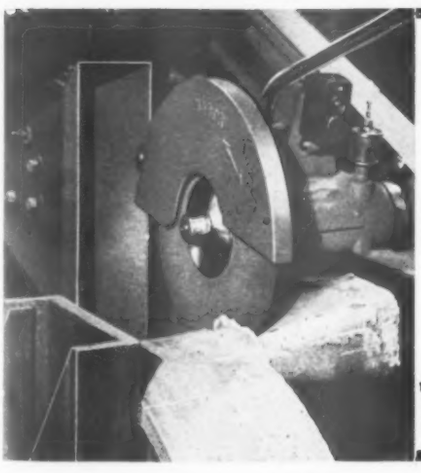

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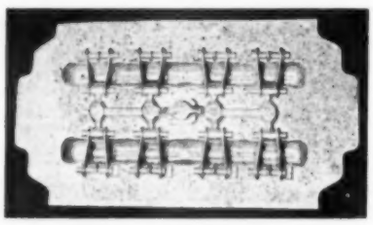

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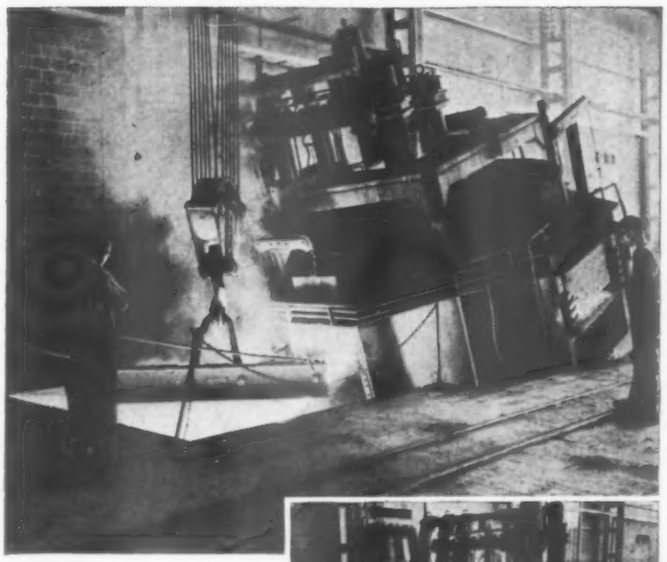

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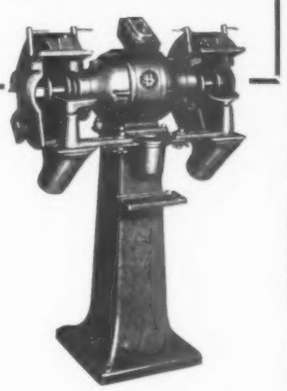

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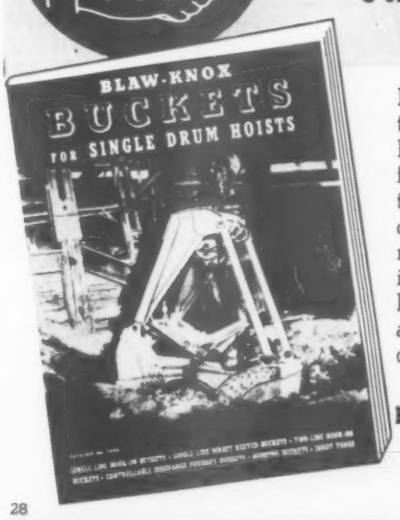

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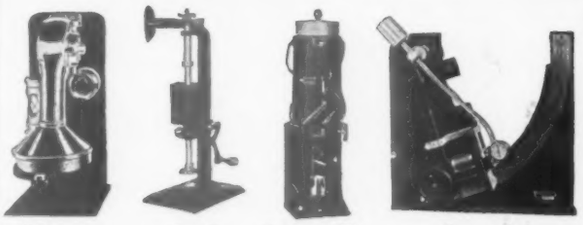

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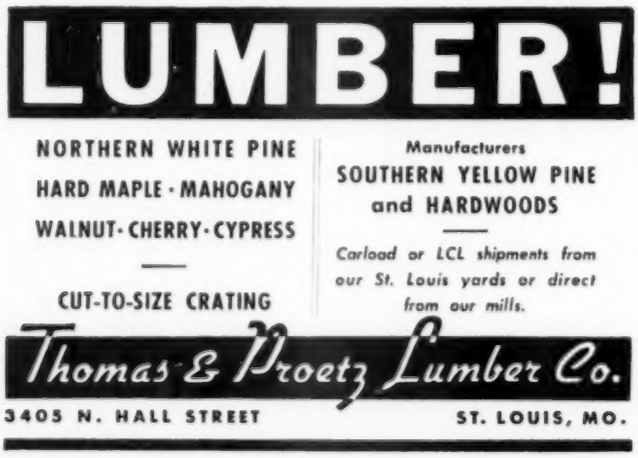

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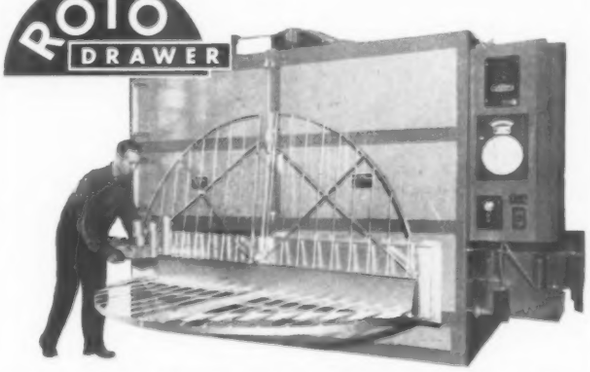

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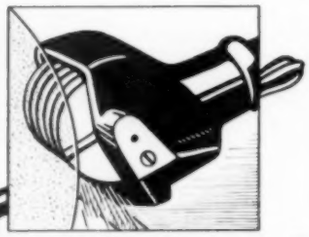

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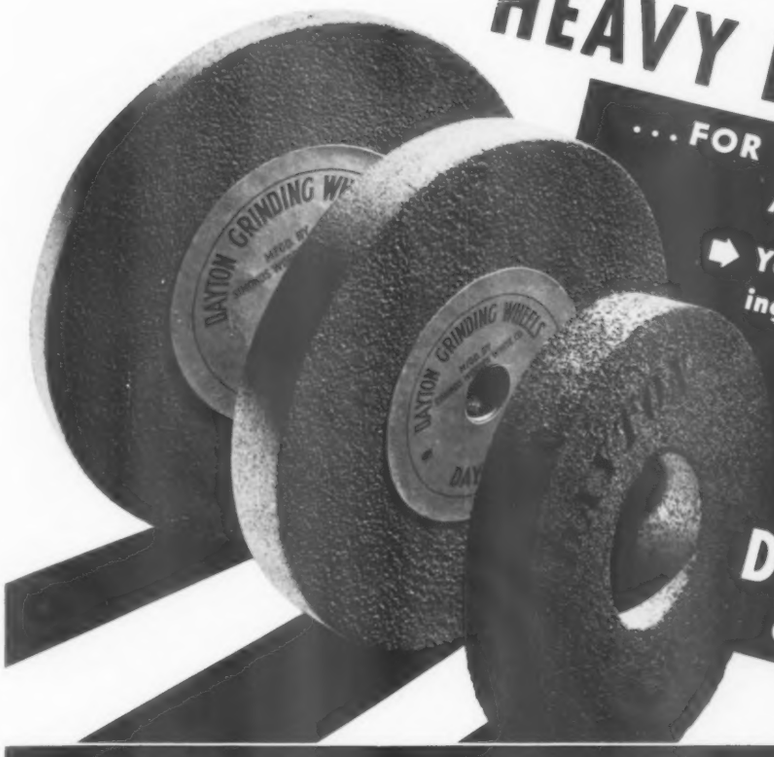

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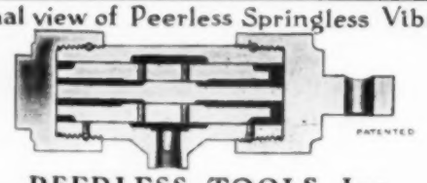

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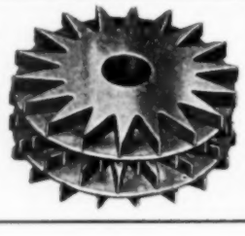

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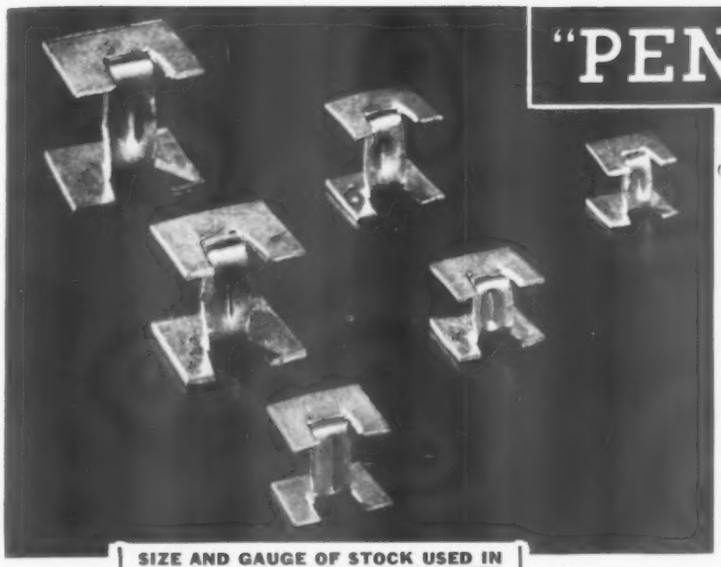

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¾"	⅞" x 1"	No. 16 "
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1"	1" x 1⅛"	No. 15 "
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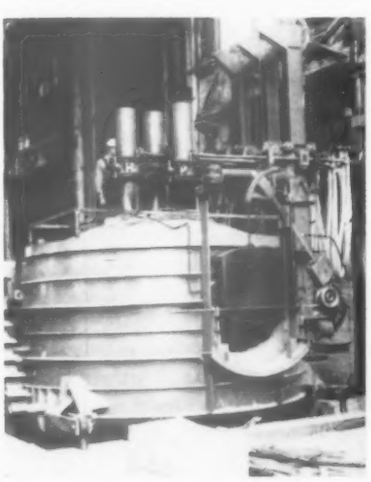

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FOR SALE

2—New Haven Sand Blast Machines Model A. 36" x 46".

For cleaning medium and small size castings and forgings

BOTWINIK BROTHERS, INC.
303 Welton St. Hamden, Conn.

GRINDER FOR SALE

48" BESLY Vertical Spindle DISC GRINDER arranged for motor drive.

BAUER MACHINERY COMPANY
1114 Frankford Ave. Philadelphia, Pa.
REGent 3093

RAMMING MACHINE

1—Tabor plain jolt. Table approximately 6' square. Ten-inch dia. air cylinder. Machine has had practically no wear and is as good as new. Price $300.00 f.o.b. cars Paterson, N. J. BENJAMIN EASTWOOD COMPANY.

FOR SALE

Model DC Royer Combination of Scrap Remover and Sand Separator and Blender. Fitted with 7 ft. square hopper for grab bucket operation. This machine is in A1 operating condition and was removed from our foundry only for replacement by machine of greater capacity. Priced to sell—including spare parts. ELYRIA FOUNDRY, ELYRIA, OHIO.

FOR SALE

One No. 7, 60" dia. 30' 0" high Whiting Cupola. One 46" dia. 30' 0" high. Both complete with blowers. Address Otto Biefeld Company, Watertown, Wisconsin.

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo, Mich.

Classified Advertising

For Sale

FOR SALE

1—No. 60 Monarch Tilting Crucible Furnace equipped for oil fuel.
1—No. 80 Monarch Tilting Crucible Furnace equipped for oil fuel.
1—Preheating Furnace for crucibles. Oil equipped.
1—Fishers J-50 Combined Blower and Oil Pump 220/440 volt, 3 phase.
3—No. 1 Moline Wall Type Hand Squeezers Molding machines.
1—Universal Electric Riddle—110V with No. 10 and No. 20 screens.
1—Sprue Cutter.
1000 lbs. Weights for molds 12 x 18.

PRICE FOR THE LOT $1,300.00
COLONIAL BRONZE COMPANY
TORRINGTON, CONN.

REBUILT
BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder end dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY
406 N. Peoria St. Chicago, Ill.

EQUIPMENT IN STOCK
GUARANTEED IMMEDIATE SHIPMENT
MISCELLANEOUS ITEMS

(1)—Young Bros. Gas Fired Core Oven, 12' 6" deep x 8' wide x 7' 6" high, double doors one end, 4" insulation complete with burner, flues and pyrometer.
(1)—1¾" cap. Shuster Power Sprue Cutter.
(4)—large flask vibrators.
(1)—10-HP. Black & Decker, double end 230-VDC Grinder, capacity 24" wheels.

AIR COMPRESSORS & BLOWERS

(1)—Ing.-Rand XCB, 2-stage, 9¼ x 12 x 15 x 12, 100-HP. motor, 220-/3/60-cycle.
(1)—12 x 12 Chicago N.S.B. 375-CFM. @ 100 lbs. with idler, unloader and lubricator.
(1)—12 x 10 Penna. 365-CFM. @ 100 lbs. belt drive, 60-HP. C.W. slip ring motor, 220/3/60-cy.
(1)—No. 4 Wil. Green Positive Pressure cap. 13-cu. ft. per rev.

ELECTRIC MONORAIL HOISTS

(30)—½ to 5-ton, 1 and 2 motor, Fl. and Cage operated, 230/440-volts, 3-Ph. 60-CY. 110 and 230-VDC.

OVERHEAD ELECTRIC TRAVELING CRANES

(1) to 50-tons cap. 18' 0" to 91' 0" span, 220/440-volts, A.C. and 230-VDC. We operate the largest crane rebuilding plant in the country. Send us your specifications for Cranes, Electric Monorail Hoists, Crane Motors, Standard Motors, Steel Buildings and Runways. We can quote you on equipment rebuilt to your specifications.

T. B. MacCABE CO.
4304 Clarissa St. Philadelphia, Pa.

For Sale

SPECIAL SALE

1—Tumblast.
1—Newton Cupola, 40" shell, blower and 10 H motor.
2—Speed Reducers.
1—No. 4 Roots Blower.
2—Motor-driven Grinding Wheel Stands.
1—Chisholm-Moore Electric Crane, 4-Ton capacity, 3 motors, span 18' 11".
1—6-Ton Worm Geared Ladle.
1—No. 1 Demmler Core Blower.
1—Royer.
1—10 x 12 Chicago Pneumatic Air Compressor with 20 H motor.
1—12 x 12 Ingersoll-Rand Air Compressor with 50 H motor.
Chain Falls.
Core Ovens.
Thor Portable Air Grinders.
Air Chipping Hammers.
AC & DC Motors.
JW-International Jolt Strippers.
JW-2 International Jolt Squeezers.
J-75 Osborn Jolt Squeezers.
Tabor Jolt Strippers.
24" x 42" Tumbling Mills.
24" x 48" Tumbling Mills.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo, Mich.

FOR SALE

One 2-cylinder—17½" Dia.—NORCROSS JARRING MACHINE—table size 50" x 144". Capacity 24,000 pounds. Subject to prior sale. The Transit Supply Company, Snell & Univ. Aves., St. Paul, Minn.

TWO MOLDING MACHINES

NICHOLLS Jolt Strip Squeeze—husky and in excellent condition. Ready for immediate shipment. Address Box 870, The FOUNDRY, Cleveland.

FOR SALE

One No. 6 Piqua positive pressure blower, 20" x 60"—35 ft. displ. top discharge, mounted on bed-plate direct connected to 40 h.p. Wagner 3/60/220 A. C. motor, with starter . . . used.

Address Box 760, The FOUNDRY, Cleveland.

FOR SALE

1—43 x 16 International Jolt Roll-over Draw Type F—good condition.
1—J. C. Busch Sprue Cutter 3½" blade, one set extra new knives—good condition.
Address Box 886, The FOUNDRY, Cleveland.

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.

ELECTRIC—355 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2200 ft., 2800 ft., 3600 ft., & 5000 ft.

STEAM—368 ft., 500 ft., 800 ft., 1221 ft., 1640 ft., 2200 ft., & 3000 ft.

DIESEL—368 ft., 603 ft., 900 ft. & 1300 ft.

GASOLINE—110, 160, 220, 310, 1300 ft.

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

For Sale

REBUILT COMPRESSORS AND BLOWERS

1250 CFM, @ 3¼ lbs., 3600 RPM Gen. Elec. with 30 H.P. A.C. motor drive.
(3) Buffalo Forge Pressure Blowers, 1200 cfm @ 11 oz., 9½" inlet, 7 x 7 outlet, driven by 7½ H.P. A.C. Motors.
450 CFM, 3500 RPM Gen. Elec. with 6.2 H.P. A.C. motor drive.

SAND VIBRATOR

Jeffery-Traylor, shaker type CVS-8, 6" wide hand deck, capacity 7 to 8 tons sand per hour; with 15 cycle, 110 volt, single phase vibrator motor generator set. Write, wire or phone.

The Motor Repair & Mfg. Co.
1552 Hamilton Ave. Cleveland, Ohio

FOR SALE

One each of the following: No. 3 Roots Blower; 15 and 25 HP motor; Sand Blast Room; Herman Plain Jar Bumper; No. 2 Demmler Core Blower. **KLEIN-FARRIS CO., INC.,** 610 Atlantic Ave., Boston, Mass.

WELDING EQUIPMENT

Welding, Cutting, Aircraft, Sheet-Metal, Soldering Outfits, Torches, Regulators and Gages, Acetylene Generators, Supplies, Electric Arc Welders. SUPERIOR OXY-ACETYLENE CO., HAMILTON, Dept. B, OHIO.

FOR SALE

One Cabinet Type Sly Sandblast
Address Box 854, The FOUNDRY, Cleveland.

SPECIAL DEFENSE BARGAINS

Air Receivers up to 42" dia.

60" Cupola stack sections only.

Sand Mixer: Blystone, 7 cu. ft. capacity for belt drive.

Fans—Blowers—Exhausters for cooling, ventilation, dust or fumes removal, cupolas, etc.

Fan or **Centrifugal** style blowers—Maxon-Premix—from No. 0 to No. 4, Spencer Turbine, Am. Blower Co., Sturtevant, Buffalo, Clarage, Ilg etc. for Gas or Oil fuel Combustion.

Rotary Pressure Blowers — Roots-Connersville, Garden City, Green, Piqua, Sturtevant, Am. Gas Furnace Co. etc. Send specifications.

Furnaces for Brass and Aluminum Melting—2—No. 2 U. S. Rotary Melting Furnaces—Normal capacities increased 50% in lengthened melting chambers.
Hausfeld Tilting Brass or Aluminum open flame, 400 lb. brass cap.; Booth Electric 725 lb. brass cap. with instruments. Stationary Furnaces, swing top for crucibles No. 60 to No. 150 and open top for iron pots up to 300 lb. aluminum.

Molding Machines—Osborn No. 404-S, Pit Type Jolt-stripper, "Berkshire" 34" wide stationary air squeeze, "Tabor" 8" cyl. air squeeze, "Battenfeld" (Johnston & Jennings) stationary jolt squeeze; 5 in stock. Adams—Stationary hand squeezers 48" wide 2 in stock. Mumford—Stationary Air Squeeze 14 x 18" platen.

Crane Ladles—1½, 2, 3, tons cap. Rim Pour.
1—25 H.P. Diesel Engine, horizontal.
1—Beardsley & Piner Gyratory sand screen size 36" x 59"—1 H.P. Ball Bearing 3/60/220 A.C. Motor, Vee Belt Drive.

Sand Blast Barrel—New Haven 36 x 44" for Motor direct connected, without motor.

Sand Blast Room—All steel 9'-10" x 20'-9" operators gril'ed table 3' x 10', down draft dust exhaust—8' ceiling. Air inlet thru ceiling.

Core Oven—Small portable 4 separate shelf compartments each 20" x 22" x 8" high.

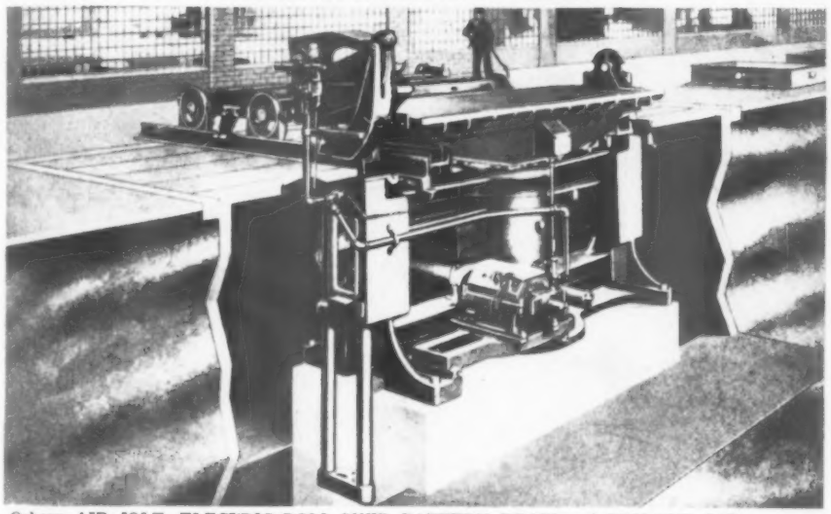
Tell us your needs.

CLIFTON MACHINERY CO.
1023 W. 6th, CINCINNATI, O.

SCULLY Reconditioned Foundry Equipment

★ ALL SCULLY EQUIPMENT IS REBUILT AND OVERHAULED IN OUR OWN, NEW MACHINE SHOP

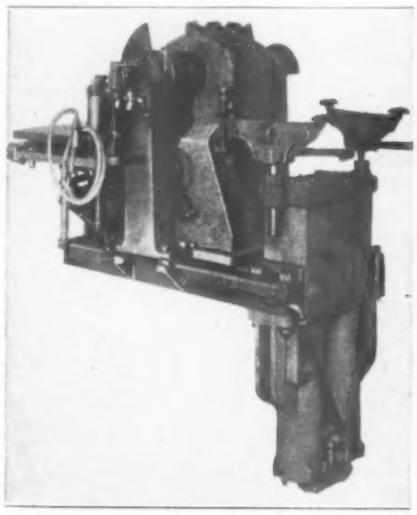
OSBORN MOLDING MACHINE



Osborn AIR JOLT, ELECTRIC ROLL-OVER PATTERN DRAW and RUN-OUT CAR
No. 509-E 60 x 96" roll-over table, 42 x 87" jolter.
No. 513-E 36 x 124" roll-over table, 36 x 112" jolter.

INTERNATIONAL MOLDING MACHINES

Type "F" 48 x 16" draw, comb. jar ramming, power turn-over power draw, 4000 lbs. cap. @ 80 lbs. press., 48 x 83" table.



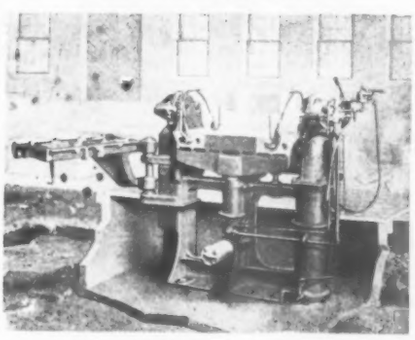
INTERNATIONAL TYPE "F"
(Enclosed Model)

Type "F" 49 x 16" draw, comb. jar ramming, power turn-over and power draw, fitted with air equalizers, rollers in the draw section and hand operated core box clamps (rollers can be readily removed) jar plate 100" long, 6000 lbs. cap. @ 80 lbs. pressure.

DAVENPORT, jolt roll-over draw, portable Molding Machine.
No. 22, 750 lb. cap. @ 80 lb. pressure, table size 20 x 31"—10" draw.
No. 24, 1000 lb. cap. @ 80 lb. pressure, table size 24 x 38"—10" draw.

HERMAN Independent turn-over and pattern drawing device.
60 x 84" roll-over, 60 x 72" bumper, 10,000 lbs. cap. @ 80 lbs.
60 x 72" roll-over, 60 x 72" bumper, 10,000 lbs. cap. @ 80 lbs.
42 x 60" roll-over, 40 x 58" bumper, 6000 lbs. cap. @ 80 lbs.
40 x 60" roll-over, 48 x 58" bumper, 4000 lbs. cap. @ 80 lbs.
46 x 56" roll-over, 40 x 50" bumper, 3000 lbs. cap. @ 80 lbs.

OSBORN Jolt Roll-Over Pattern Draw Molding Machines



No. 403, flask cap 44 x 36" pattern draw 12"—1400 lbs. cap. @ 80 lbs. press. with swing-out Mold Table.
No. 403-W flask cap 52 x 36" pattern draw 12"—1300 lbs. cap. @ 80 lbs. press. with swing-out Mold Table.
No. 405, flask cap 50 x 64"—pattern draw 18", 3000 lbs. cap. @ 80 lbs. press. with run-out Mold Car.

SQUEEZERS

No. 75-J Osborn portable JOLT SQUEEZERS, 36" between rods, 10" dia. squeeze cyl., 15 x 19" table.

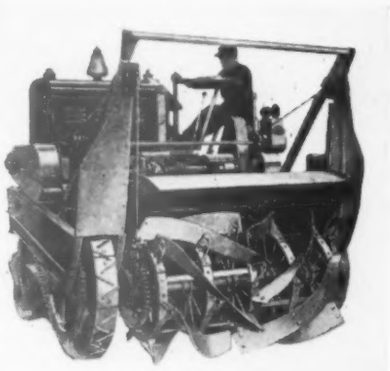
Tabor stationary PLAIN AIR SQUEEZERS, 36" between rods, 18 x 26" table.

Tabor Power Squeezing SPLIT PATTERN for 13 x 18" flask, 13" dia. cyl. 36" between rods, 4" draw.

AMERICAN SANDCUTTERS

Model "AA" size 72, 60" cutting cyl. 72" between tractor wheels, complete with 7½ HP AC Motor, Cable and Reel.

Model "AA" 68" cutting cylinder, 88" between tractor wheels, equipped with 15 HP Crocker-Wheeler 220V AC Motor, Cable and Take-Up Reel.



Cleveland Model "B" Type 5-55, 55" spiral cutting cyl. 26" dia.—66" between tractor wheels, equipped with 3 Cleveland Elec 220V AC Motors, Cable and Take-Up Reel.

Model "K" size 84"—72" cutting cyl. 84" between tractor wheels, 6" face, equipped with 30 HP Westinghouse 3/60/220V AC Induction Motor, Cable and Take-Up Reel.

Model "K"—84" spiral cutting cyl. 36" dia.—92" between tractor wheels, 5" face, equipped with 3—220V AC Motors, Cable and Take-Up Reel.

NO. 2 DEMMLER
CORE BLOWING MACHINES

JOLT SQUEEZE & STRIP POWER

Milwaukee No. 113 Jolt Squeeze Strip, open end type, portable, 500 lbs. cap. @ 80 lbs. press. 6" draw, 16 x 35" table.

No. 142 Milwaukee, stationary, stripping cap. 1200 lbs. @ 80 lbs. press., draw 6" table 19 x 35"—open end type.

No. 703-6 Osborn jolt squeeze and strip, 21 x 28" table, stationary, length of opening in lifting frame 34", 6" pattern draw, 8" cyl. dia. 1000 lbs. jolt. cap. @ 80 lbs. pressure, distance from lifting frame to squeeze head 24¼", flask length 44½", with roll off conveyor.

No. 703-5 Osborn, same as above excepting 17 x 35" table.

OVERHEAD ELECTRIC TRAVELING CRANES

35-ton Morgan Power House Type 4-motors 550V DC with Aux Hoist, Chain on Main Hoist Cable on Aux, approx. 36 ft. span.

15-ton P&H, approx. span 33'3" 3-motor type 230V DC, cage oper.

10-ton, approx. 33'0" span, 3-motor type, 115V DC, cage oper.

10-ton P&H approx. 27 ft. span, 3-motor type, 220V DC motors, cab oper. drum type cont. 25 ft. lift (double drum type Trolley).

5-ton Shepard approx. 18'5" span, 1-motor type 6 HP 220V DC, trolley and bridge hand racked, boxed girders.

1½-2 tons DETROIT Type "H" LoHed Room, 3-motors, floor oper., approx. span 26'6" 3/60/220V AC 15" "I" Beams.

SCULLY MACHINERY & EQUIPMENT CORP.
(Formerly – Foundry Division of Scully-Jones & Co.)
2031 WEST 74th STREET (Phone PROspect 8770) CHICAGO, ILLINOIS

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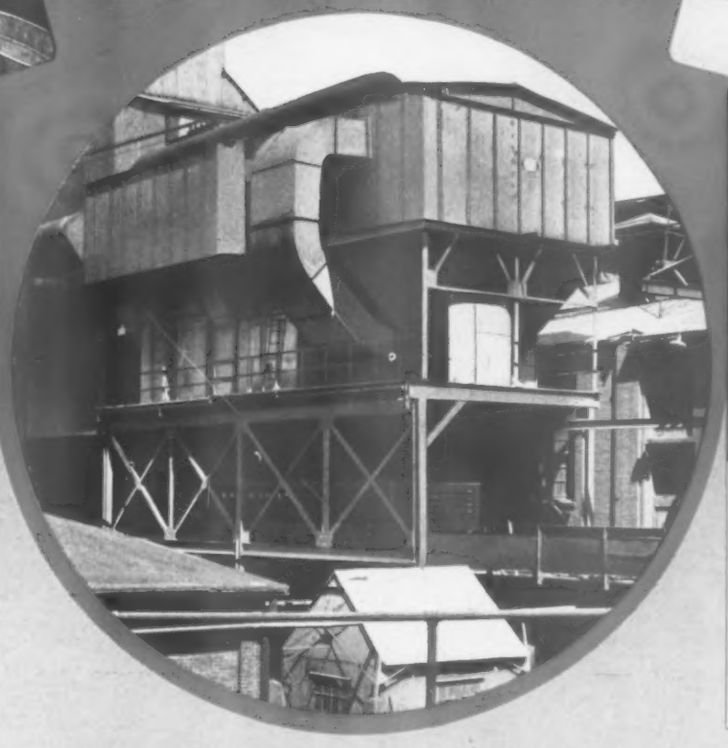
PARSONS

OVAL-BAG DUST ARRESTORS



They CLEAN · COLLECT · CLARIFY

• Parsons Oval Bag Dust Arrestors are the choice of the trade because they have over a quarter of a century of specialized engineering experience back of them which is brought out in their many exclusive features. For instance Parsons ***PATENTED OVAL FILTERING BAGS*** have all the advantages of envelope and cylindrical types and have an extremely long life.

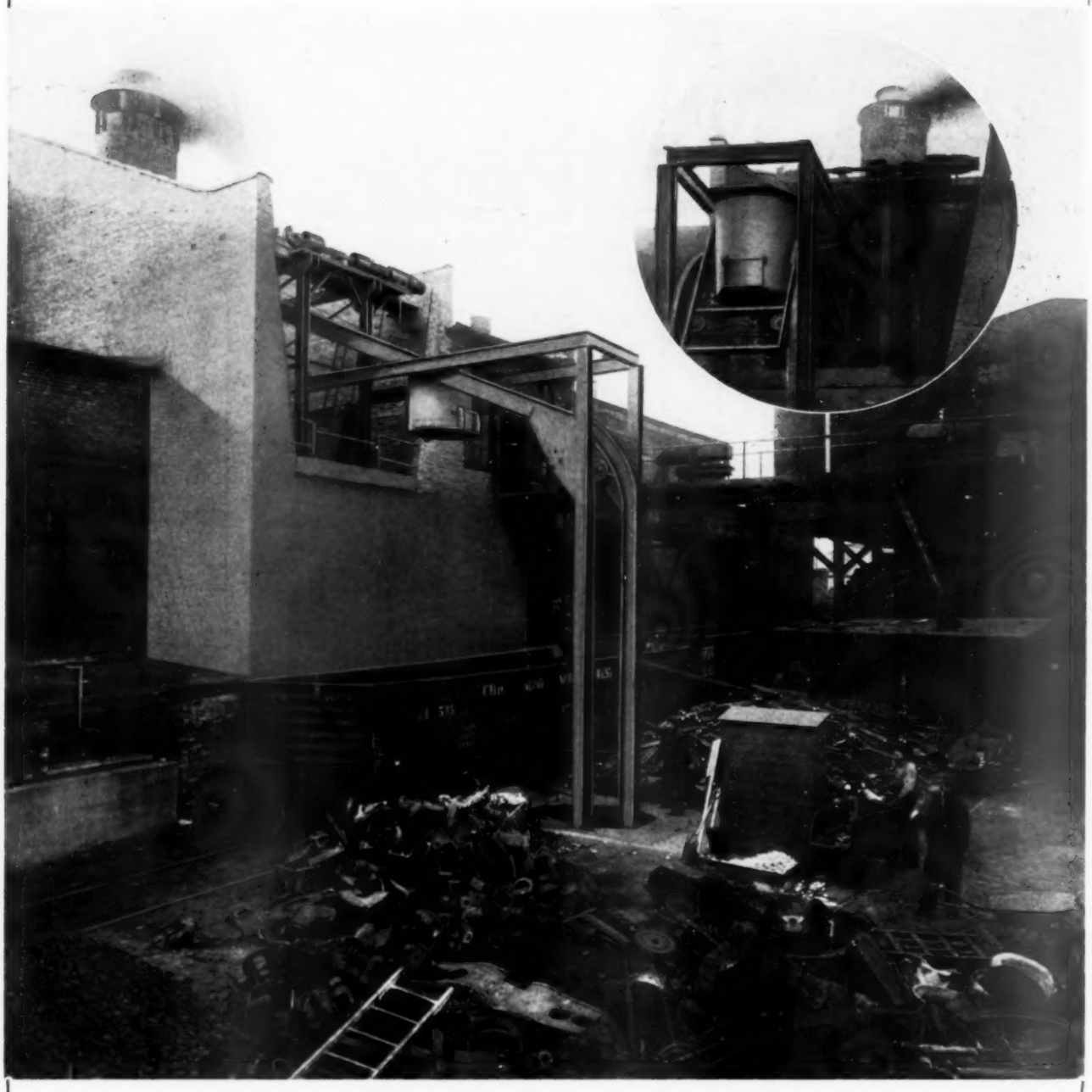
NON-RUSTING ARRESTOR CASE makes maintenance and inspection possible on clean air side and permits instant spotting of leaks. ***SIMPLE TEXROPE DRIVE*** and balanced eccentric mechanism operates rocker type bag-shaking device, 100 per cent discharge. ***HEAVY DUTY WELDED HOPPERS*** discharged by non-clogging rubber sealed hopper valves easily operated and absolutely dust-tight.

PARSONS . . . a name which means over a quarter of a century of specialized engineering experience in dust control

PARSONS *Engineering* CORP.

545 EAST 79TH STREET • CLEVELAND, OHIO

Ring out the Old . . . Ring in the New!



That's more truth than poetry in the above Middle Western foundry. The new Modern Cupola Charger has replaced the old elevator and truck system still shown in the background. Result—charges laid in evenly, better packed, with better metal at greatly reduced handling cost.

Present heavy production schedules and post war economies require that you investigate this superior means of charging. Write us now for details.

MODERN
CUPOLAS

MODERN EQUIPMENT COMPANY
PORT WASHINGTON, WIS., DEPT. 197

Lifetime Geared Ladles
Improved Bottom Pour Ladles
Metal Pouring Systems

Crane & Monorail Systems for Metal & Mold Handling
Furnace Charging Cranes

MODERN EQUIPMENT CO.
PORT WASHINGTON, WIS.

What have you "SLATED" for 1943?

You can depend on one thing—1943 will be a hectic year; full of sudden surprises—changes in policy and plans. The only thing certain is a state of uncertainty.

Successful foundry operators will be those who most quickly adapt themselves to these changing conditions—who, like a cat, will "land on their feet."

There are three ways in which the Stevens organization is well qualified to eliminate much of that uncertainty.

1. Stevens Foundry Supplies and Equipment are known by foundry men from coast to coast for their excellent performance—under most severe working conditions.
2. Our Laboratory is staffed by highly trained technicians. Through research and experiments, they are continually working out difficult problems confronting the industry—your problems.
3. The Stevens Sales and Service Departments are composed of men who are constantly "on their toes"—ready to serve you.

If you'll put Stevens Foundry Supplies and Equipment on your "slate" for 1943, you'll be "slated for less uncertainty."

•

The resources of the Stevens' organization are always at your service. Your inquiries sent here, will be handled by men who know their business—and YOURS.

Of Course You've Included

STEVENS FOUNDRY SUPPLIES and EQUIPMENT

Our Slogan for over 60 years—

"Everything for a Foundry"

Buy DEFENSE BONDS

FREDERIC B. STEVENS, INC.

Detroit, Michigan

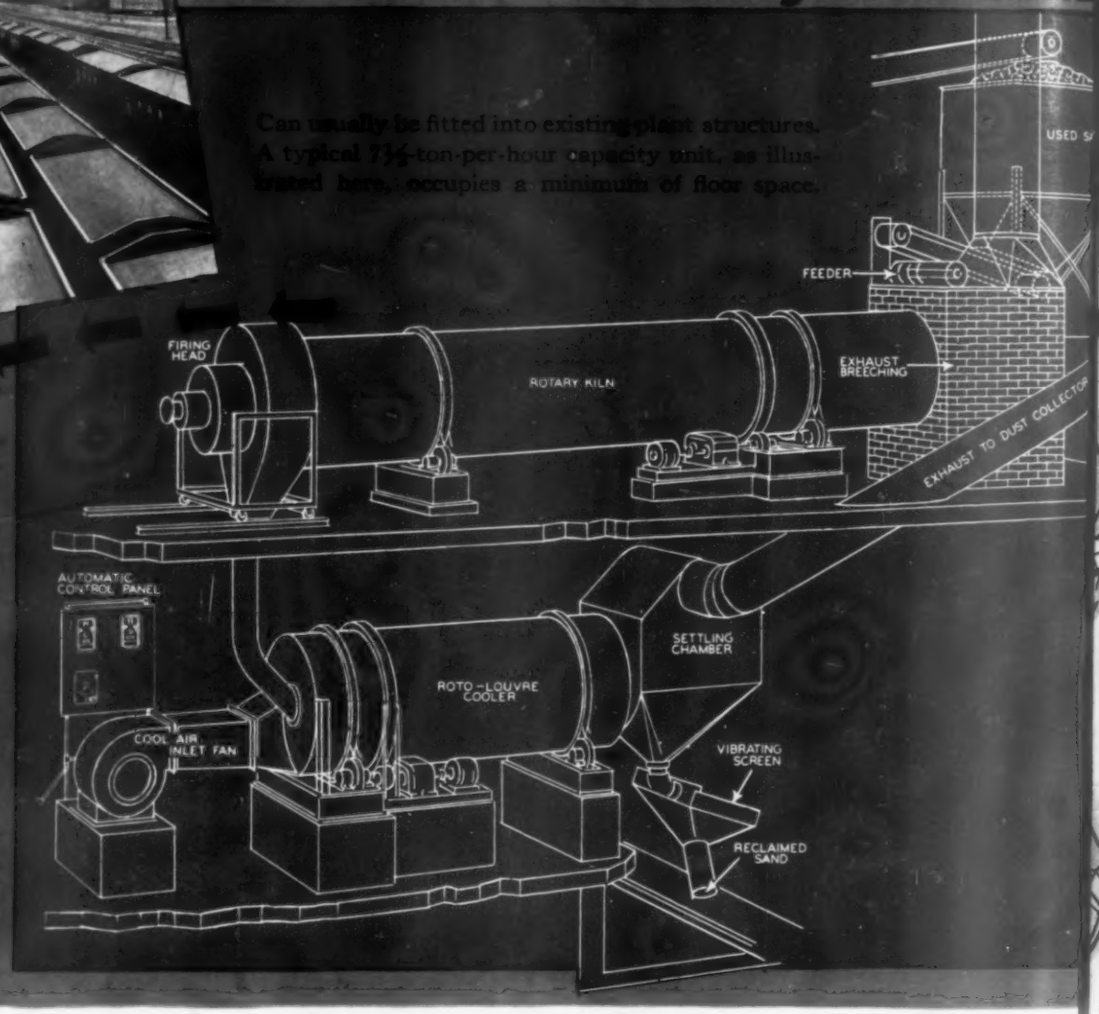
NEW ENGLAND . . . . 166-182 Brewery St., New Haven, Conn.
NEW YORK and PENNSYLVANIA . . 93 Stone St., Buffalo, N. Y.
INDIANA . . Hoosier Supply Co., 36 S. Cruse St., Indianapolis, Ind.

• CANADA . . Frederic B. Stevens of Canada, Limited
• 1262 McDougall St. . . . . Windsor, Ontario
• 2368 Dundas St. West . . . . . Toronto, Ontario

18,000 CARS of SAND Saved Annually— *in War Production*

Foundries with New Link-Belt Thermal Method of Reclaiming CORE SAND

Can usually be fitted into existing plant structures. A typical 7½-ton-per-hour capacity unit, as illustrated here, occupies a minimum of floor space.



● Think of it! 18,000 cars . . . nearly a million tons of core sand previously disposed of as waste, after one use, is now to be restored to as clean and usable a condition as when new, by this new process. (Patents applied for.) Link-Belt thermal reclaiming systems of this kind having a capacity to handle this annual volume, are now in service and being installed in aircraft and tank parts foundries.

Here is conservation in a big way—in labor, in handling, in transportation—with tremendous dollar savings. Fully tried, proved and accepted by the industry's largest operators.

Essentially, the system consists of the equipment shown in this diagrammatic drawing. Binders, oils and other foreign material are burned out of the shakeout-sand after the cores have been broken and screened. The sand is then cooled in a Link-Belt Roto-Louvre cooler.

If you are interested in saving core sand, ask us to send you full information on this process.

LINK-BELT COMPANY

Chicago, Philadelphia, Indianapolis, Atlanta, Dallas, San Francisco, Toronto
Offices in Principal Cities

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LINK-BELT *Sand Preparation* EQUIPMENT